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PRINWASS Project

Working Paper Vol. 3, N° 8

An examination of the politics of privatization of water and sanitation services in Africa, Europe, and Latin America (1990-2004). Comparative Analyses

Newcastle upon Tyne and Buenos Aires, December 2016

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Research Projects Series SPIPRW
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Jose Esteban Castro (Ed.)

Keywords

Water and sanitation, public policies, political ecology of urban water, privatization, public-private partnerships, neoliberal politics, Argentina, Bolivia, Brazil, England and Wales, Finland, Greece, Kenya, Mexico, Tanzania

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Presentation of the Working Paper

We are glad to present a new Working Paper of the PRINWASS Project Series (SPIPRW). The SPIPRW Series has the objective of making available the final reports of the PRINWASS Project. This project was carried out between 2001 and 2004 and was funded by the European Union's Fifth Framework Programme. PRINWASS is a major landmark for our network, as WATERLAT-GOBACIT was created by a group of PRINWASS partners after the project ended to continue working together on the politics of water and water services.

Although some time has passed since the project ended, the topics addressed and the project's findings have significant relevance and can contribute towards better understanding some of the challenges currently facing the implementation of progressive, egalitarian water politics. In short, PRINWASS' main objective was to examine critically the policies of privatization of water and sanitation services implemented worldwide during the 1990s, looking at specific cases from Africa, Europe and Latin America. The project carried out case studies in Argentina, Bolivia, Brazil, England and Wales, Finland, Greece, Kenya, Mexico, and Tanzania, and developed comparative analyses of the main findings. Although the reports were freely available by request, and we produced a number of specific publications based on the project's findings, much of the material remains largely unknown and, for this reason, we launched the SPIPRW Series to facilitate their dissemination.

This Working Paper presents the 6 Cross-Comparative Reports that provide an analysis of key findings of the different case studies of the PRINWASS Project. The original reports were written in 2004, and therefore sometimes contains reference that may be outdated. We decided to keep the original texts, and only edited them to adapt the formatting, to make some corrections, update some references or add clarifications. We hope that the readers will find this material useful and that it can contribute to the work of our researchers, students, activists, and others in their activities to understand better the internal workings and the huge impacts of water privatization processes. These policies are not only very much alive, but are also experiencing a worldwide revival. Therefore, we believe that the findings and lessons that emerged from the PRINWASS Project deserve this publication effort. We wish you all a pleasant and fruitful reading.

Jose Esteban Castro
General Editor and Working Paper Editor

Newcastle upon Tyne and Buenos Aires, December 2016

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List of Acronyms and Abreviations

AASA	Aguas Argentinas (Buenos Aires water utility, Argentina)
AFDB	African Development Bank
AMBA	Buenos Aires Metropolitan Area
ANA	Agência Nacional de Águas – National Water Agency (Brazil)
ASEP	Rio de Janeiro State's Regulatory Agency for Public Services (Brazil)
BNDES	National Bank for Economic and Social Development (Brazil)
BLT	Build-lease-transfer
BOD	Biochemical Oxygen Demand
BOO	Build, operate and own
BOT	Build-Operate-Transfer
CADE	Council of Economic Defence (Brazil)
CAASA	Aguascalientes Water Company S. A. (Mexico)
CCAPAMA	Potable Water and Sewerage Citizen Commission of Aguascalientes Municipality (Mexico)
CAPAMA	Potable Water and Sewerage Commission of Aguascalientes Municipality (Mexico)
CCRs	Cross Comparative Reports
CCW	Customer Council for Water (England and Wales)
CDC	Consumer Defence Code (Brazil)
CEAMSE	Ecological Coordination Metropolitan Area Public Company
CEDAE	State Water and Sanitation Company (Rio de Janeiro, Brazil)
CENEP	Population Studies Centre (Buenos Aires, Argentina)
CIDE	Rio de Janeiro's Information and Data Center (Brazil)
CNA	National Water Commission (Mexico)
COMPESA	Pernambuco's Water and Sanitation Company (Brazil)
CONAMA	National Council on Environment (Brazil)
D1-Dn	We refer to the different project reports ("deliverables" in the jargon of EC-funded research) as documents D1, D2, D3 …Dn. We list them in the bibliography under the name of the document's main author or co-ordinator, as it may correspond. When a reference is made in the text, we provide both the acronym and the author's reference: D2 (Seppälä, 2002). A full list of the project's deliverables can be consulted in the project's web site: http://users.ox.ac.uk/~prinwass/.
DEFRA	Department for Environment, Food, and Rural Affairs (United Kingdom)
DMAE	Municipal Department of Water and Sanitation (Porto Alegre, Brazil)
DWI	Drinking Water Inspectorate (England and Wales)
EC	European Commission
ECLAC	UN Economic Commission for Latin America and the Caribbean
EMAS	Eco-Management and Audit Scheme
EMASESA	Seville's Municipal Company for Water and Sanitation Services (Spain)
EMUSA	Housing, Urbanization and Sanitation Enterprise (Niterói, Brazil)
ENOHSA	National Entity for Water and Sanitation Works (Argentina)

ERSACT	Regulatory Agency of Tucumán's Water and Sewerage Services (Argentina)
ESA	External support agency
ESH	Environmental Sanitation and Hygiene
ESYE	National Statistics Service (Greece)
ETOSS	Ente Tripartito de Obras y Servicios Sanitarios – Tripartite Entity for Sanitary Works and Services (Argentina)
EU	European Union
EWURA	Energy and Water Utilities Regulatory Authority (Tanzania)
EYDAP	Athens Water Supply and Sewerage Inc. (Greece)
FEI	Finnish Environment Institute
FLACSO	Latin American Faculty of Social Sciences
HDI	Human Development Index
GDP	Gross Domestic Product
GLA	Greater London Authority
GNI	Gross National Income
GNP	Gross National Product
GTZ	German Agency for Technical Cooperation
IBAMA	Instituto Brasileiro de Meio Ambiente e Recursos Naturais Renováveis Brazilian Institute for Environment and Renewable Natural Resources
IBGE	Brazilian Institute of Geography and Statistics
IBRD	International Bank for Reconstruction and Development
ICSID	International Centre for Settlement of Investment Disputes
IDB	Inter-American Development Bank
IFIs	International Financial Institutions
IIED	International Institute for Environmental Development
IMF	International Monetary Fund
IMTA	Mexican Institute of Water Technology
INAGUA	Water Institute (Aguascalientes, Mexico)
INCO-DEV	International Cooperation for Development, European Commission
INDEC	National Institute for Statistics and Censuses (Argentina)
INE	National Statistics Institute (Bolivia)
INEGI	National Institute for Statistics, Geography and Informatics (Mexico)
IPDU	Planning and Urban Development Institute (Tucumán, Argentina)
LCA	Life Cycle Assessment
LRC	London Research Centre
MDGs	Millennium Development Goals
MENR	Ministry of Environment and Natural Resources (Kenya)
MESPPW	Ministry of Environment, Spatial Planning and Public Works (Greece)
MMC	Monopolies and Mergers Commission (England and Wales)
MoLG	Ministry of Local Government (Kenya)
MSyAS	Ministry of Health and Social Development (Argentina)
MWRMD	Ministry of Water Resources Management and Development (Kenya)
NEP	National Executive Power (Argentina)
NGO	Non-governmental organisation

NRA	National Rivers Authority (England and Wales)
NWCPC	National Water Conservation and Pipeline Corporation (Kenya)
NWSS	National Water and Sanitation Services Strategy (Kenya)
OECD	Organisation for Economic Cooperation and Development
OFT	Office of Fair Trading (England and Wales)
OFWAT	Office of Water Services (United Kingdom)
OSN	Obras Sanitarias de la Nación (Argentina)
PI	Private involvement
PLANASA	National Sanitation Plan (Brazil)
PMN	Municipal Government of Niterói (Rio de Janiero, Brazil)
PMES	Service Enhancement and Expansion Programme
PMSS	Modernization Programme for Water and Sanitation Services (Brazil)
PRINWASS	Barriers to and conditions for the involvement of private capital and enterprise in water supply and sanitation in Latin America and Africa: Seeking economic, social and environmental sustainability
PROLAGOS	Water and Sewerage Services Company of the Lakes Region (Brazil)
PRONAPAC	National Programme for Potable Water and Sewerage (Argentina)
PSP	Private Sector Participation
REC	Regional Environment Centre
RWAs	Regional Water Authorities (England and Wales)
SAAE	Autonomous System of Water and Sewerage (Limeira, Brazil)
SABESP	Sao Paulo State's Water and Sanitation Company (Sao Paulo, Brazil)
SADM	Water and Sanitation Services of Monterrey (Nuevo León, Mexico)
SARH	Secretariat of Agriculture and Water Resources (Mexico)
SEMAPA	Cochabamba Municipal Service of Potable Water (Bolivia)
SICOMSA	Integral System for the Commercialization of Water (Aguascalientes)
SIRESE	Water Sector Regulatory System (Bolivia)
SISAB	Superintendence of Basic Sanitation (Bolivia)
SNIS	National System of Information about Sanitation (Brazil)
SNSA	National Secretariat for Environmental Sanitation (Brazil)
SRNyDS	Bureau of the Environment and Sustainable Development (Argentina)
UK	United Kingdom
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNIREN	Unit for Renegotiation of Contracts of Public Services (Argentina)
USAID	United States Agency for International Development
USD	United States dollar
WaSC	Water and Sewerage Company (England and Wales)
WoC	Water Only Company (England and Wales)
WRMA	Water Resources Management Authority (Kenya)
WSB	Water Services Board (Kenya)
WSP	Water Services Provider (Kenya)
WSRB	Water Services Regulatory Board (Kenya)
WSS	Water Supply and Sanitation

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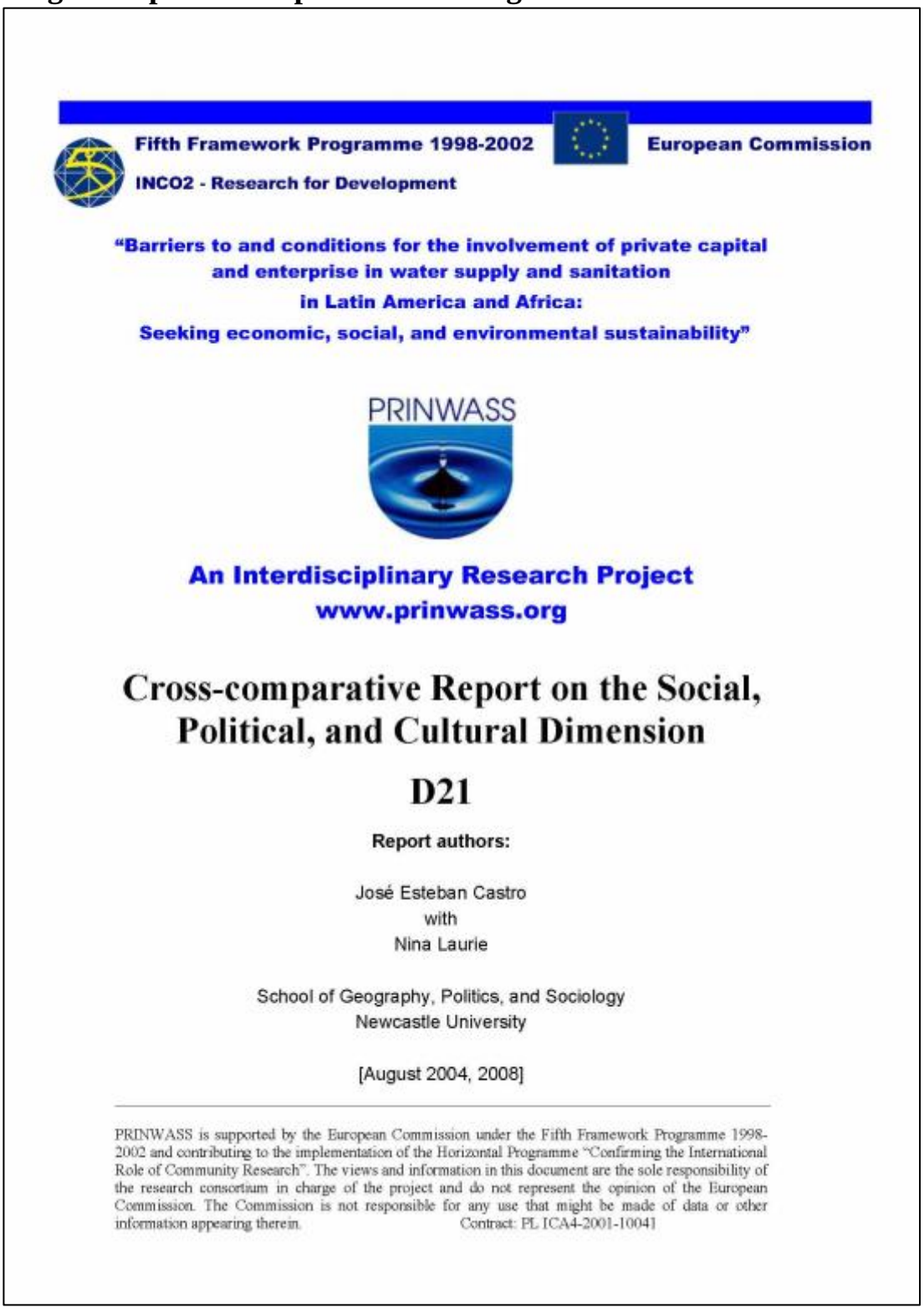

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PRINWASS

An Interdisciplinary Research Project
www.prinwass.org

Cross-comparative Report on the Social, Political, and Cultural Dimension

D21

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with
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[August 2004, 2008]

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ARTICLE 1

Cross-comparative report on the social, political and cultural dimension[1]

José Esteban Castro,[2] National Scientific and Technical Research Council (CONICET), Argentina

Introduction[3]

This document presents a comparative analysis of the socio-political and cultural dimension of private sector participation (PSP) in the provision of water and sanitation services (WSS), as it has been implemented in mainstream water policy[4] since the 1980s. Although the promotion of PSP in the water sector has been often presented as providing technical tools which are politically neutral, the political character of the policies mainstreamed since the 1980s is made apparent, for instance, by the mounting evidence of the direct action taken by OECD countries through their government departments, aid agencies, lending policies, or through the programmes designed and implemented by bilateral and multilateral institutions in a combination of pressure and persuasion to foster public sector reforms and introducing PSP.

However, it would be misleading to explain the particular process of PSP expansion studied by this project by reducing it to the –undoubtedly crucial– influence exercised by the governments of the OECD countries and the international financial institutions (IFIs), in particular the IMF, the IDB, and the World Bank. In fact, any rigorous study of this development must look at the interactions of these global actors with developing country governments and institutions as well as exploring the interdependencies between representatives of the global and local intelligentsias in fostering the implementation of these policies. The actual processes have often taken the

1 The original report was developed with support for specific issues about the Bolivian case from Nina Laurie, who at the time was based at Newcastle University, UK.

2 E-mail: jecastro@conicet.gov.ar.

3 I have avoided unnecessary referencing throughout the report to make the text more readable, although for specific pieces of information or analysis I have provided the relevant references for easy consultation. Apart from these cases, all the information on which the comparative analysis is based has been extracted from the PRINWASS case study reports, which are listed by author in alphabetic order in the Reference List.

4 I will often refer to "mainstream" water policies, by which I mean the policies that have been the priority of the international financial institutions (e.g. World Bank), aid agencies (e.g. USAID), and the governments of OECD countries. These have been mainly the policies of deregulation, liberalization, and private sector expansion implemented in the water sector worldwide since the 1980s. I am aware that there are different approaches within this overall policy trend, and that there is no monolithic position even inside the institutions that have been at the forefront of these policies.

form of a translation, when not merely transplantation, into developing countries of policies largely based on fairly simplistic assumptions about socio-economic, political and cultural processes.

The evidence gathered in our research confirms one of the project's hypotheses regarding the centrality of the political dimension for the analysis and explanation of our research problem. Underscoring the challenges facing the policies oriented at expanding PSP in the water and sanitation sector there is a clash between competing models of governance. In this regard, it is worth recalling some of the central issues involved in the notion of governance,

> The core of governance has to do with determining what ends and values should be chosen and the means by which those ends and values should be pursued, i.e. the direction of the social unit, e.g. society, community or organization. Governance includes activities such as efforts to influence the social construction of shared beliefs about reality; the creation of identities and institutions (Therborn, 1991); the allocation and regulation of rights and obligations among interested parties; and the distribution of economic means and welfare services. Governance, in other words, is the shaping and sustaining of the arrangements of authority and power within which actors make decisions and frame policies that are binding on individual and collective actors within different territorial bounds, such as those of the state, county and municipality (Hanf and Jansen, 1998: 3).

Some of the crucial aspects involved in the notion of governance have been explored elsewhere in this project, in particular the economic-financial and the legal-institutional dimensions.[5] The main focus in this paper is what I have broadly termed in this Project the socio-political and cultural dimension. Therefore, the document examines the policies promoting PSP expansion in the water and sanitation sector since the 1980s looking at the particular set of ends, values, and principles about how WSS should be organized as well as the means that have been chosen to achieve these ends.

Section 2 explores the interrelation between the far-reaching public sector reforms implemented worldwide and the process of PSP expansion in the water and sanitation sector, in reference both to the general trends and to the particular situations experienced in the countries covered by the study. Section 3 examines how the set of principles underscoring mainstream WSS policies have informed actual reforms in the field, with emphasis on the transformation of water resources and services from public into private goods, the promotion of unregulated (or poorly regulated) private water monopolies, and the attempt to transform the social identities of water users from right holders into customers.

Section 4 looks at the tensions and contradictions between formal and substantive citizenship as they are manifested in the implementation of mainstream WSS policies. Despite the rhetoric of citizen –or at least user– participation accompanying these policies, in practice the evidence suggests that citizens have been systematically excluded

[5] See, in this collection, Article 2, by Azpiazu and Schorr, and Article 3, by Vargas and Seppälä.

from meaningful participation whether it is in the decision making processes leading to the granting of PSP concessions or in the monitoring of these concessions once they have been awarded. Section 5 addresses the crucial issue of value incommensurability, which is one key factor explaining the recurrent failure of PSP programmes in developing countries. The evidence shows that the multi-dimensional values associated with water in different cultures have often been ignored in an attempt to reduce this diversity to the one-dimensional valuation of water and WSS in market terms that drives the expansion of PSP policies in the sector. This problem underscores many of the recorded instances of failure and also contributes to the explanation of the rapidly increasing disproval of PSP policies in those regions where it spread during the 1990s, like Latin America.

Finally, a brief concluding section summarizes the findings and the Appendix provides additional supporting material.

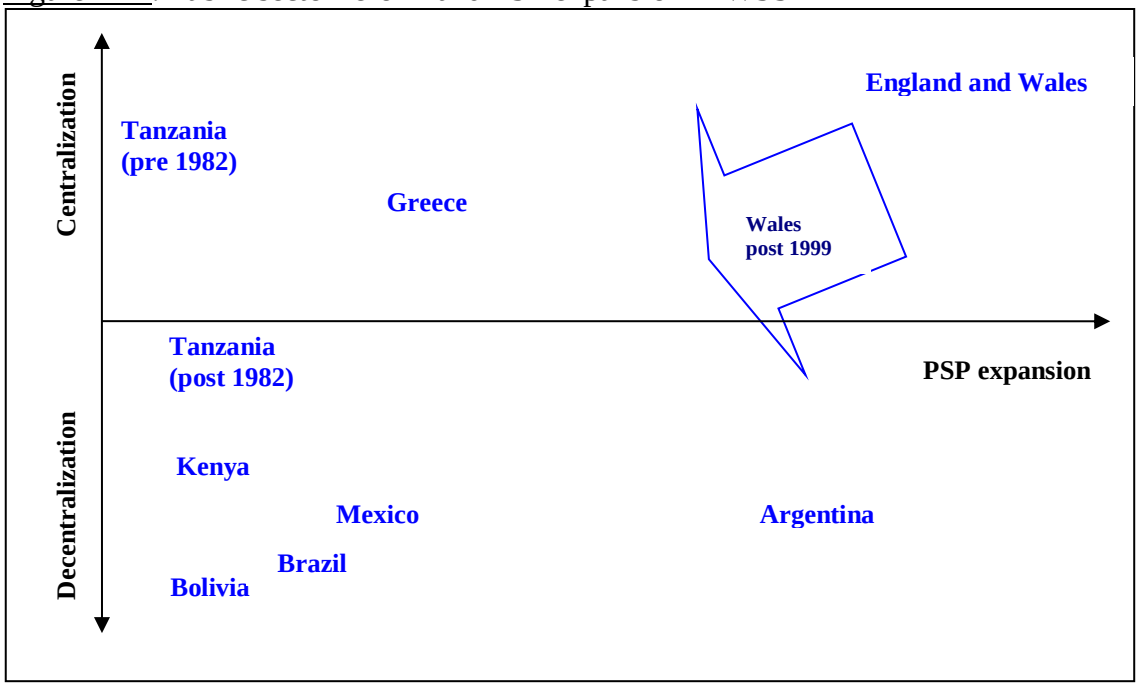
Public sector reform policies and PSP expansion

The brief historical background provided in the case study reports shows the connections between the policies promoting the expansion of private sector participation in WSS and the processes of public sector reform introduced since the early 1980s worldwide. The case study material provides good evidence to explore the particular expressions that these global trends have taken in the different countries and regions. One particular feature that is worth highlighting are the diverging trends of centralization and decentralization observed in the different countries studied. A note of caution has to be included here, as I am describing formal processes and am not assuming that these policies have actually decentralized power in a meaningful way (for instance, by sustainably empowering provincial and local authorities and communities). In fact, the evidence suggests that this has not been the case in most of the examples studied, in particular in developing countries.

With few exceptions, local authorities have not been strengthened by the decentralization policies and more often than not they have been actually weakened because they have seen their duties and responsibilities greatly increased without a corresponding enhancement neither of their political and financial autonomy or administrative and technical capacities. As shown later, this has been reflected, among other issues, in the pattern of poor performance affecting local and provincial authorities in the regulation and monitoring of private concessions in the WSS sector. In some cases, in what seems to be a paradox, decentralization has been actually twined with a degree of centralization in crucial policy decisions, as illustrated by the case of Argentina during the 1990s where the federal executive was able to foster PSP reforms virtually unchecked owing to the absence of any counterbalancing forces. An important counter development, however, was observed in Wales, where the process of "devolution" of a limited degree of autonomy from the UK executive in London to the provincial level led to the creation of the National Assembly for Wales in July 1999. One the first decisions approved by the Assembly was the de-privatization of the Welsh water utility in 2001 and its transformation into a not-for-profit entity, which became the first clear departure from the system of full-divestiture established in England and Wales in 1989.

Nevertheless, keeping in mind the mentioned counter movements, the countries studied can be broadly clustered as following two different trends: a first group formed by England and Wales and –to a lesser extent– Greece (this may apply mainly to Athens) that experienced different degrees of centralization and even weakening of the role of local authorities since the mid 1970s. Tanzania also experienced a process of centralization and delocalisation between 1972 and 1982 –although paradoxically these policies were implemented under the label of "decentralization"–, but the country gave a U turn in 1982 and has followed a pattern closer to the second group of developing countries studied, Argentina, Bolivia, Brazil, Kenya, and Mexico, which underwent processes of decentralization of WSS from the federal to the provincial and municipal levels (see Appendix 1). Finland is a special case from the perspective of these policies, as the country has a long-standing tradition of decentralized WSS policies, which have been in the hands of municipal bodies and cooperatives since the late nineteenth century.

Figure Nº 1. Public sector reform and PSP expansion in WSS



Regarding the first group, in England and Wales there has been a consistent trend towards further centralization of WSS since World War II, which neared completion in the far-reaching reforms introduced in 1973-74 when over 1000 municipal and small scale WSS were amalgamated in ten basin-wide Regional Water Authorities (RWAs). The role of local authorities in overseeing these services was further curtailed by new reforms implemented in 1983, and by the time when the ten RWAs were privatised in 1989, the WSS systems had undergone an unprecedented process of delocalisation, regionalization and centralization in the country. It should be noticed here that although the devolution of limited legislative autonomy to Wales in 1999 is an important counter

development, especially because it led to the de-privatization of the Welsh water utility in 2001, it has not been part of a wider process of decentralization of public decision making. In Greece, the WSS utility of Athens that had been in private hands since 1928 until the mid 1970s was placed in the federal domain in 1980 under the form of a "corporatized utility" directly dependent from the government, though in the rest of the country WSS remained in municipal hands.

Apart from these two cases, the rest has followed a general trend of decentralization of WSS that can be traced back at least to 1980 with the break up in Argentina of the National Water and Sanitation Works (OSN) carried out by the military dictatorship that ruled the country at that time (1976-1983). Decentralization policies were also introduced in Tanzania (1982), Mexico (1983), Bolivia (1985-89), Kenya (1986), and Brazil (1988), although there has been a high variance among these countries' experiences regarding the actual pace and scope of implementation as well as in the concrete forms adopted by the policies in the field. Thus, Argentina has been the only case where decentralization was effectively followed by a large-scale programme of PSP expansion implemented since 1989 in the whole country, with small though significant exceptions. Between 1991, when the first privatization of WSS took place in the province of Corrientes, and 1999 the proportion of the country's population that had its WSS provided by private companies rose from 0 to 70 percent. However, even in this case there were some important counter forces at work, as illustrated by the province of Chaco where a public consultation held in 1994 to reform the provincial constitution with the aim of promoting PSP resulted in the massive opposition of the electorate to the policy. As a result, PSP became banned by the provincial constitution, a decision that cost the province dearly as it was excluded from the National Programme for Potable Water and Sewerage (PRONAPAC) funded by the Inter American Development Bank (IDB): access to PRONAPAC's funding was conditional on opening the WSS sector to private sector participation.

In all other cases the transition from decentralization to PSP expansion in WSS has been much slower and restricted in scope. Perhaps the best example is Brazil, where the process of decentralization prompted by the 1988 constitutional reform was not translated into an expansion of private sector participation in the WSS, despite the "enabling environment" created by legal and administrative reforms introduced since the early 1990s with the backing of –and through the conditionalities imposed by– the IFIs. Thus, after over one decade of pro-PSP reforms in the water sector only 5 percent of the urban population of Brazil was served by private operators in 2004. From a total of around 5700 municipalities only 33 have granted their WSS in concession to private operators, while only 2 of the 33 state capitals and none of the state WSS utilities have adopted the model of PSP promoted by the mainstream policies.

The Brazilian experience regarding the interrelation between decentralization and PSP expansion merits further examination given that the 1988 constitutional reform elicited an increasing autonomy of municipal power vis a vis the traditionally powerful provincial governments, which is of the highest relevance to understand the processes at work in the WSS sector. In this connection, decentralization has produced contradictory results. On the hand, as shown later, in the cases chosen for this research –all of them municipalities– the introduction of PSP was made possible thanks to increased municipal autonomy that gave mayors stronger decision powers in a context of rapid institutional

change in WSS. The 1995 Concessions Law, which was part of a full package of pro-PSP reforms mostly funded by the IDB and the World Bank, was timely approved in congress at a time when most municipal WSS concessions granted in the 1970s to the state water utilities were coming to an end. This was perceived as a very fertile ground for PSP, especially because there is a widespread inconformity with the state concessionaries among the municipalities.

On the other hand, however, a large number of municipalities in Brazil have been engaged in a long-term struggle for the democratisation of WSS since the 1970s, and they perceived the policies of PSP expansion as a new threat that had to be confronted. These municipalities, organized through the National Association of Municipal Water and Sanitation Services (ASSEMAE),[6] continue to challenge the authoritarian model of the state water utilities but have also become strong opponents of the pro-PSP initiatives introduced in the country since 1990. Their active political role, fostered by the decentralization process, and in alliance with NGOs, unions, important sectors of the Catholic Church, and community organizations, among other actors, is one of the key factors explaining the slow and very limited progress of PSP expansion in Brazil.

Nevertheless, to achieve a better understanding of the process I tried to go beyond the institutional and formal confrontations around decentralization and PSP expansion to examine the underlying principles and assumptions that underscore these reforms, which I discuss next.

The confrontation of policy principles

The reforms implemented since the 1980s in the WSS sector were largely predicated on the set of principles[7] associated with the "neoliberal" model that has inspired mainstream water policy worldwide during the last two decades. Although there is a need to differentiate between several strands of economic rationalism that range from extreme neoliberal calls for unregulated free-market water policies to the moderate introduction of economic principles for enhancing the management and administration of water resources and WSS, mainstream water policies implemented since the 1980s have been mostly framed in neoliberal terms.

[6] A large number of municipalities engaged in a struggle for the democratisation of the WSS sector since the 1970s, when most systems were given in concession to the state water utilities under strong pressures from the military dictatorship that ruled the country at the time. These municipalities created the National Association of Municipal Water and Sanitation Services (ASSEMAE - http://www.assemae.org.br/), which has become a major actor in the field.

[7] It is important to keep in mind that I am here discussing formal policy principles and I do not assume that there is a perfect correspondence between these principles and the actual processes taking place in the ground. This is valid both for the discussion on neoliberal water policy principles as well as for the principles of administrative and economic rationalism (e.g. I do not assume that the state is intrinsically a defender of the "public interest" as understood in the administrative rationalist framework).

Text Box Nº 1. Key principles of neoliberal water policy

a) Water resources should be allocated through the market; that is, private water rights should be created replacing any existing forms of collective or public rights and they should be freely tradable;

b) Water services have to be considered an economic good, in the sense of being a private good that has to be bought in the market; by definition, once WSS are considered to be private goods, non-payers can be excluded from accessing them; the notion that WSS are a public or social good must be abandoned;

c) Water services should be provided by private operators, which are inherently more efficient than public ones; if possible, water services should be self regulated by market mechanisms and state intervention should be minimized if not altogether cancelled;

d) Water services are not a natural monopoly, as claimed by the defenders of state intervention; most operations can actually be opened to competition, perhaps with the exception of some core activities; however, high transaction costs can make competition difficult; in these cases, a privately-owned water monopoly is preferable to a public one; even then, keep regulation to a minimum or cancel it altogether if possible;

e) Water users should be transformed into consumers, and right holders into customers.

Source: Castro (2006), chapter 6.

However, the implementation of these policies has not taken place in the historical vacuum, a fact that the actors promoting these reforms have slowly come to find out. In particular, from the perspective of this section, in most countries formal WSS continue to be organized along the principles of what has been termed "administrative rationalism", a public sector tradition that has been responsible for effectively developing the water sector worldwide and –at least in developed countries– for the universalization of WSS since the mid twentieth century. The resilience of the administrative rationalist tradition, together with other factors considered in forthcoming sections, is likely to be an important explanatory element for the slow progress of PSP in the water sector.

Text Box Nº 2. Administrative rationalism in the water sector

Since the late nineteenth century the management of water resources and WSS was increasingly organized around the principles of "administrative rationalism". Administrative rationalism, the result of a "marriage" between scientific and bureaucratic expertise, was grounded on the assumption that the state had a central role to play in the governance and management of water resources and WSS, which gave way to the emergence of powerful state institutions and a tradition of public-sector management whereby water and WSS were conceived as politically strategic public goods that cannot be governed and managed on the basis of free market principles. This tradition that gave the state the role of promoter and defender of the public interest vis-à-vis narrower private interests was reinforced in the period post-World War II with the policies of universalization of essential services such as water and sanitation. In this regard, although there is certainly scope for the introduction of economic rationalist principles within the framework of administrative rationalism, free market policies such as the development of unregulated (or self-regulated) private water monopolies or full cost-recovery mechanisms to transform WSS from public into private goods in situations where a large sector of users cannot afford to pay for these services at their market price are largely out of the question.

Let us go back to mainstream water policy as implemented since the 1980s. Although the core set of principles characterizing these policies can be distilled from the theoretical and political literature, they are not equally shared by all actors promoting pro-PSP policies, at least not to the full extent of their meaning and practical implications, and even within the institutions that have been at the forefront of PSP expansion like the World Bank it is possible to find significant disagreements among their water sector experts regarding water policy. A good example was provided by Joseph Stiglitz, former Chief Economist at the World Bank, in his evaluation of the role played by the IFIs in developing countries:

> In setting the rules of the game, commercial and financial interests and mind-sets have seemingly prevailed within the international economic institutions. A particular view of the role of government and markets has come to prevail –a view which is not universally accepted within the developed countries, but which is being forced upon the developing countries and the economies in transition (Stiglitz, 2002: 224-5).

This is a significant statement because it emphasises that despite the intricacies and internal contradictions characterizing the system of global financial governance, it is possible to discern the regularities and trajectories characterizing the changing balance between the socio-economic and political forces at work. This lends support to our argument that although the principles have not been mechanically translated into practice,

they constitute the fundamental elements that structure much of the actual policies implemented in the water sector worldwide since the 1980s, and our case studies provide substantial evidence to this effect. This, though, does not mean that these principles have been effectively or coherently applied. In fact, the actual deployment of these policies has often exposed the fallacious and mutually contradictory character of some of the principles such as, for instance, the claim that PSP would enhance competitiveness. The evidence from our study, which is consistent with the findings emerging from other research efforts, shows that there is no competition between providers, that competition for the market is severely restricted to a small number of large multinational companies, and that the vertical integration of the utilities (as a trend, not subject to regulation) encourages monopolistic behavior.[8] Nevertheless, our main focus here is on the confrontation between alternative principles informing water policy, among which the transformation of water from public or social into private good has paramount importance.

From public to private good?

Let us first examine the principle that water resources and WSS should no longer be considered to be a public service or a social right and should rather be transformed into a private good. The following passage from a recent pro-PSP leaflet distributed by the World Bank's illustrates how this principle is informing mainstream water policy:

> The governments of most countries have put in place monopoly utilities to run urban water supply and sewerage systems. This is because governments believe the nature of the infrastructure required, and the large economies of scale, mean these services are most efficiently operated by a single entity. The government thus gives one utility the right to operate, and subsequently regulates its prices and/or profit. In most cases this entity has been run and owned by the government. The public has become used to this and perceives services of these utilities as a "public service" or even a "social good". However, publicly run utilities in developing countries have been singularly unsuccessful in providing reliable water supply and sanitation services. Most find themselves locked in a downward spiral of weak performance incentives, low willingness to pay by customers, insufficient funding for maintenance leading to deterioration of assets, and political interference. A common reform measure is bringing in the private sector to provide specialized expertise, efficient management and new sources of capital (WSP & PPIAF, 2002: 8-10).

I kept the quote long to avoid decontextualizing the bank's argument, but want to concentrate mainly on the particular emphasis given here to the notions of "public service" and "social good", which are portrayed as anachronistic beliefs or naïve products

[8] For a more specific account on competitiveness see Article 2 by Azpiazu and Schorr.

of the popular imagination. This deserves some attention. Firstly, this association between the concepts of public service and social good and the failure of the public sector in developing countries to universalize safe WSS is certainly misleading. This sweeping overgeneralization dismisses the historical fact that WSS were universalized in developed countries through public sector initiatives and precisely because these services were conceptualised as essential public services and as social goods of citizenship. Moreover, this argument also neglects the fact that, despite its many drawbacks and problems, a large majority of the world's population is served by public sector utilities, many of which are leading examples of efficient administrative and technical management.[9] In fact, the evidence suggests that even in developed countries WSS will very likely continue to be in public hands for the foreseeable future owing to a constellation of factors, including financial, technical, and political reasons.[10] Secondly, the text assumes the existence of a mechanical association between public sector delivery of WSS and such issues as "low willingness to pay by customers", which implicitly, perhaps, conveys the notion that PSP expansion could somehow elicit in the population the much sought "willingness to pay" for these services. Let us consider now some examples from the case study material to examine the validity of these assumptions.

Water resources

Cochabamba in Bolivia is the only case among those examined where the concession of WSS to a private operator openly included the granting of private rights over the water sources. Although in other cases far-reaching policy reforms were introduced to create (or legitimate de facto existing) private rights over water, such as in Mexico through the 1992 constitutional reform to Art 27 and the introduction of a new National Water Law, formal private rights over water resources destined for WSS were not included in the concessions examined. Even in the case of England and Wales where the private operators own the infrastructure of the WSS (full divestiture), water resources are in public hands and are regulated by the Environment Agency, the multi-sector environmental regulator which is in charge of monitoring compliance with the terms of the abstraction and discharge permits granted to the private operators.[11]

[9] For instance, in Brazil and Mexico, [when this report was originally written] after around 10 years of PSP experience in the WSS sector, the best performing utilities are public, such as SABESP (the state water utility of Sao Paulo) and DMAE (the municipal water company of Porto Alegre, in Rio Grande do Sul), among others in Brazil or SADM (the state water company of Nuevo Leon) in Mexico.

[10] As stated by a recent report on the case of WSS in the US: "Continued public ownership and operation is the most likely future for the majority of public utilities. Many public water utilities are likely to respond to the pressures of possible privatization by improving their performance, rather than privatising part or all of their operations and ownership [emphasis in the original]" (National Research Council, 2002: 8-9).

[11] In fact, the system is undergoing a process of change whereby the state and the regulators are attempting to reassert public control over a system of abstraction rights that grew in a largely unplanned fashion over a period of several centuries. The process has been very slow and cumbersome and there is no sign that a prompt solution will be achieved (DEFRA 1999; 2001). In some ways, the process resembles other situations identified elsewhere, most notably Mexico (see Castro, 2006, chapter 5).

The case of Cochabamba, where the water rights of indigenous farmers were threatened with de facto expropriation by the introduction of PSP in 1999 is in this particular sense unique among our case studies. A large share of water resources in the Cochabamba basin –and in the Andean region generally– is governed by systems of water rights know locally as "uses and customs" that have been in place for centuries. The 1999 Water Law opened the field for the private operator to gain control over existing and future water sources in the basin, which proved to be the single most important driver of the massive mobilization –in which organized peasant irrigators played the central role– that finally led to the collapse of the concession and to the withdrawal of the entire federal cabinet in March 2000.

Water and sanitation services

In most cases studied, the implementation of the principle that water should be treated as a private good has been limited to the provision of WSS. In general, implementing this principle required important changes to the legal framework and even to the national constitution in some cases (see Appendix 1), changes that were heavily influenced by conditionalities imposed on developing countries as a requirement for the reception of aid or loans. As a general trend, in all cases studied the legal framework for granting concessions of WSS to private companies included the right of disconnection for non payment, which is the logical consequence of transforming the status of WSS from public to private good (i.e. in economic theory private goods are those that non-payers can be excluded from consuming).[12] It is worth keeping in mind as already suggested the differentiation between the introduction of economic rationalist principles like proper pricing of public services to ensure their economic and financial sustainability, and the transformation of WSS into for-profit private activities, most commonly referred to as "commodification".[13] Although these processes can be closely knitted in practice to the point that their differentiation might be difficult, there is an important distance both in principle and also in relation to the consequences. While always difficult to justify, rising prices for WSS when users perceive that there is a fair and more or less transparent system at work –for example, if they are part of the decision making process, are somehow represented in it, or at least are protected from extreme abuse in some way– is far more

[12] It is important to note that disconnection policies are also applied by public operators. In those cases, however, disconnection seems to be practiced with a higher degree of political legitimacy perhaps because users are receiving a public service, not purchasing a privately owned commodity (e.g. EMASESA, the municipal WSS utility of Seville in Spain, routinely practices disconnection apparently with a high degree of legitimacy [EMASESA, 2000]). In some other cases that have been brought to our attention, disconnection is practiced by public operators that differentiate between likely free-riders mostly from high and middle income sectors and vulnerable users such as low-income families (e.g. the case of DMAE, the municipal WSS utility of Porto Alegre, Brazil).

[13] In relation to water, and environmental goods and services generally, commodification can be defined as the process by which relations between human beings and the natural environment become increasingly transformed into market transactions and the elements of nature converted into tradable commodities for private profit.

feasible and sustainable than doing it when the general perception is that narrow private interests are benefiting from what is broadly considered to be an essential public service.

This is not just a matter of perception or preference, and the cases studied provide significant evidence about the problems arising from the commodification of WSS through the expansion of private sector participation. In particular, the introduction of PSP has been followed by steep price increases and a systematic trend to favour short-term shareholder interest over users' satisfaction and contractual investment commitments (see examples in Text Boxes 3 to 9).

Text Box Nº 3. Argentina - Buenos Aires

- Between the start of the concession in 1993 and 2002 the private company increased water bills by 88.2 percent compared to increases of 7.3 percent in the consumer price index and 8.9 percent in the wholesale price index during the same period
- The private operator can suspend the service to non-payers (domestic users) after 120 days; in addition to being liable for the cost of suspension (notification, disconnection and reconnection), affected users can still be charged for fixed costs (50 percent of the basic rate for non-measured users or a fixed charge for measured users) while they are disconnected from the service. The company has the right to recover the debt, plus interests and costs
- The study has showed that tariff increases had a stronger negative impact on the poorer sectors of the population, contributing to the worsening inequality gap: in the Greater Buenos Aires, the poorer 10 percent of the population spends in average 9 percent of total income in their WSS bill, while for the average consumer the proportion is 1.9 percent

Text Box Nº 4. Argentina - Tucuman

- After the concession was granted in 1995 the private company increased water bills by 67 percent plus a further 39 percent composed by taxes and regulatory fees that were charged to the users for first the time
- Problems with the quality of the service (users complained that water had a brownish color and chemical analysis showed a higher than normal concentration of manganese in the supply) and an extremely hot Summer in 1996 led to large scale civil disobedience when 86 percent of the users stopped paying their water bills (including businesses and government offices)
- Disconnection for non-payment was established in the contract, but the provincial legislature banned it in 1997
- In February 1996 the regulator asked the private operator to reduce the bills to compensate for the quality problems, which the company refused to do; in March the regulator fined the company for the quality problems and the lack of response
- The private operator sued the federal government of Argentina before the ICSID for a compensation of 300 million dollars; the case continues
- In 1997 the provincial government cancelled the concession and months later the operation of WSS was resumed by the public sector

Text Box Nº 5. Bolivia - Cochabamba

- After the concession was granted in 1999 the private company increased water bills by 35 percent (average), which affected especially the poorest users (the minimum charge came to represent almost 22 percent of the minimum wage)
- The concession contract established an automatic indexation of the tariff according to the US dollar exchange rate
- The private operator was entitled to suspend the service to non-payers; after a period of six months without payment the disconnection would be permanent and the operator had the right to start legal action to recover the debt
- The contract also established monopoly control over water sources by the private operator and the right of compulsory connection to the network
- In response to the 35 percent increase in water bills, users organizations rallied in protest (January 2000) to ask for the
  - repeal of the Water and Sanitation Services Law
  - reversal of the decrees that made the concession viable
  - cancellation of the concession contract
  - dismissal of the sector's regulator
  - a public consultation to discuss the Water Resource Law being debated in Parliament at that time
- After massive public mobilizations and bitter confrontations that made Cochabamba sadly famous worldwide the concession was cancelled and the entire federal cabinet withdrew in March 2000

Text Box Nº 6. Brazil - Lakes Region, Niteroi, and Limeira

Lakes Region, Rio de Janeiro

- Disconnection policy for non-payers
- Virtual disconnection policy through the use of pre-paid water cards in slums
- Widespread clandestine water vending

Niteroi, Rio de Janeiro

- Full scale metering for commercial and educational reasons, even in slums
- In 2003 the cost of connecting to the network (water and sewerage) was equivalent to 2 minimum wages

Text Box Nº 7. England and Wales

- After privatization in 1989 the private companies were authorized to increase prices above inflation accumulating in average a 95 percent increase between 1989-99
- Between 1990 and 1995 the number of pre-summons notices sent by the private companies to households in arrears rose by 900 percent. In 1994, almost 2 million households (near 9 percent of the total) defaulted on their water bills. The companies responded with a strict implementation of disconnection for non-payment. Other methods also employed were pre-payment meters (where non-payers are "self disconnected"), trickle-flow meters (non payment results in a reduced water flow), and the "2-in-1 system" applied by multi-utilities (where non payment of water leads to the disconnection of another essential service, normally electricity, which is provided by the same company)
- Dividends paid to shareholders amounted to over 17 billion pounds (1990-2002)
- The combined debt of the private companies amounted to 19 billion pounds in 2004, from 0 in 1989
- A prolonged drought in 1995-6 exposed the lack of compliance of the private companies with investment programmes. This, together with a widespread public disappointment with the extraordinary shareholder gains and salaries for top executives ("fat cats" in the local jargon) prompted a policy review helped by a change in government at the 1997 elections
- As a result of the 1999 review, the private companies were required to reduce prices (-12 percent in average) for 1999-2004 to compensate for excessive gains in the previous period and submit revised investments plans
- Disconnection was banned in 1997 as a result of strong political opposition to the practice, including pressures from high profile institutions like the British Medical Association
- By 2004, 20 percent of the households in England and Wales are in debt with the privatized utilities (and some analysts blame the banning of disconnection for the sharp increase in non-payment)
- According to government criteria, between 2 and 4 million households are "water poor" in 2004 (families that have serious problems to afford their water bills)
- The private operators asked an average increase in water bills of around 30 percent for the period 2005-2010, but the regulator OFWAT finally authorized a 13 percent increase (8 percent to be applied in the first year, 2005).

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Text Box Nº 8. Nyeri and Tala, Kenya

Nyeri

- After the concession was granted in 1998 the tariff was increased, especially for the poorest users who buy water from water vendors (water "kiosks" that resell water bought from the private concessionaire) and pay up to 100 times more.
- Different surveys carried out in 1999 showed high dissatisfaction among water users (in one survey, 78 percent of respondents complained about the high cost of water after privatization; in another survey carried out by the private operator in 2002, 58 percent of respondents were not satisfied with the level of water fees)
- The private operator is entitled to disconnect non-payers; in case of several households sharing a water bill, non-payers are barred from using the common yard tap; in extreme cases families are evicted from their houses

Tala

- After the concession was granted in 1999 prices increased, especially for the poorest users (similar to the case of Nyeri)
- A survey carried out in 2002 found that households in Tala were using between 5 and 9 percent of their income to pay for water bills.
- The private operator is entitled to disconnect non-payers; in case of several households sharing a water bill, non-payers are barred from using the common yard tap; extreme cases of non payment led to families being evicted from their houses
- The high price charged to the poorest users may explain the decline in water use observed among poor households that buy water from water kiosks
- Another worrying trend observed was that many families resorted to fetch their own water from unsafe sources, and the occurrence of water related diseases such bilharzias, typhoid and diarrhea is increasing

Text Box Nº 9. Aguascalientes, Mexico

- After the concession was granted in 1993 the tariff was increased by 10 percent every 2 months during the first year
- Since 1993 the private operator was entitled to disconnect non-payers, but disconnection was banned in 2002 by the provincial Congress
- The economic crisis of 1994 (the "Tequilazo") created a situation where the sustainability of the business would have required an additional increase of 170 percent in early 1995, but this was deemed unfeasible by the authorities
- In 1996 the private operator had to be "rescued" by the public sector (a de facto subsidy to free the private company from mounting debts)
- Rising problems with non-payment of water bills led to different solutions:

  - owing to conflicts with the federal Health Law that forbids disconnection of essential water supplies, the operator allegedly resorted to restrict the water supply to non-payers by lowering the pressure in the pipes

  - a Social Support Fund was created to cross-subsidize low-income users

  - a discretionary mechanism organized by the private operator (resembling the old clientelistic politics practiced by the former public sector providers) for granting discounts and waving unpaid bills was established and functions on a weekly basis (it is called "Citizen Wednesday")
- The diagnosis of the problem suggests that the key factors explaining non-payment are that the water tariff is unaffordable for low income users (around 70 percent of total domestic users in the city are classified as low income) and that there was no payment culture for WSS prior to the concession

The evidence gathered shows that, although the association between low willingness to pay and public sector delivery of WSS may hold true in many cases, the association between higher willingness to pay and PSP expansion does not. What has been observed is that improved administration of WSS through modernization of billing systems and better accounting enhance the business results of the utilities, whether public or private (this has been observed in the Mexican and Brazilian cases, in Buenos Aires, in the Kenyan examples, and in the Finnish public utilities). When this is twined with improvements in service delivery that lead to increased and sustained user satisfaction, higher willingness to pay can be expected, at least among those social sectors that can afford to pay the bills. In most cases observed, though, user dissatisfaction was recurrent and non payment of water bills is often one of the chosen tactics to express it. In cases like England and Wales, where user disobedience has not been as openly explicit as in the Latin American examples, it should not be discarded that current levels of non payment (affecting 20 percent of the households) be the partial result of a silent revolt

against the commodification of WSS. Interestingly enough, according to water experts and representatives of consumer associations interviewed during the research affordability problems in England and Wales would only explain a relatively small fraction of cases, while the ban of disconnection in 1997 would be the main factor behind the sharp increase in non payment in recent years. Although the controversy around the causes for non payment continues, the evidence strongly suggests that there is a poor association between expanding PSP and enhancing the willingness to pay on the part of WSS users.[14]

Nevertheless, affordability problems are certainly part of the explanation of the unwillingness to pay showed by users in the developing countries involved in the study where a large share of the population lives in extreme poverty, such as Bolivia or Kenya, but also in the poorest neighbourhoods and slums of the urban areas of Argentina, Brazil, and Mexico. In this connection, as showed by the analysis of the economic impact of PSP-related tariff increases, the poorer sectors of the population are the worst affected,[15] which is consistent with the findings of ongoing research[16] on the topic and refutes claims that the expansion of PSP in water and sanitation is helping the disadvantaged.

This discussion brings us closer to the consideration of another principle of mainstream WSS policy: the claim that self-regulating private monopolies are the best instruments to extend WSS to the poor in developing countries, on which I focus next.

The unregulated private monopoly

Although admittedly this is an extreme position among economic rationalists, the principle that WSS services should be provided by unregulated private monopolies is one of the tenets that I have identified in the specialized literature promoting PSP in the water sector. These authors have gone well beyond the argument that the private sector is inherently superior to the public to claim that private water monopolies would achieve the most beneficial results for the poor in developing countries if left unregulated (Brook Cowen and Cowen, 1998[17]). In our interviews with water experts in different countries, including private sector representatives, the fact that this argument in favour of unregulated private water monopolies has been put forward by top officers of the IFIs promoting PSP worldwide caused all sort of reactions ranging from disbelief to

[14] In fact, there is substantial evidence of the impact of rising water tariffs on the poorer sectors of the population in England and Wales since privatization (Herbert and Kempson, 1995; Ward, 1997: chapter1; Bakker, 2001; Drakeford, 2002). On the most recent wave of non payment problems, see Fitch and Howard, 2002; United Kingdom Parliament, 2003; also, the National Consumer Council's web page on affordability problems in the privatised UK WSS sector: http://www.ncc.org.uk/fuelandwater/index.htm#water. See also OFWAT (2004), pp. 14-19.

[15] See Article 2 by Azpiazu and Schorr. Also see the case study reports, in particular Azpiazu et. al., 2003; Nyangeri, 2003, and Torregrosa et. al., 2003.

[16] See, for instance, the special issue of Geoforum on "Pro-poor' water: past present and future scenarios" (Laurie, 2004).

[17] See also Newbery (1999: 385-6) for an argument in favour of the superiority of self-regulation by market forces over regulation in the case of networked utilities.

dismissal.[18] And yet, the evidence from the case studies shows precisely that the concession contracts have mostly been launched in the absence of any regulatory framework and institutions or in conditions where the capacity of regulatory bodies to exercise control and enforce regulation has been weak or non existent. This suggests that the principle that WSS should be provided by unregulated private monopolies has –in one way or another– influenced actual policies in the field, a hypothesis which may be worth exploring further in future research efforts.

Table Nº 1a. The pattern of unregulated or poorly regulated private WSS monopolies

Case	Characteristics of the regulatory system
Argentina, Buenos Aires	The main regulator ETOSS was created in 1992 simultaneously with the bidding process, and is part of the Department of Water Resources of the federal government. Since the start of the concession in 1993 and until important reforms to the legislation implemented in 2002, ETOSS has been highly dependent on the federal executive and had very little autonomy vis a vis the private operators (e.g. in a crucial renegotiation carried out in 1997 ETOSS was not even part of the process). Although in principle the private operator is subject to anti-monopolistic legislation, there is no specific regulation for the concession and there are no restrictions on vertical or horizontal integration, or on conglomeration. The regulatory environment was strengthened since 2001 as a result of changes in the political system, which prompted an ongoing review of the controversial privatization programme implemented in the 1990s.
Argentina, Tucumán	The regulatory body ERSACT was created in 1993 prior to the concession (1995). Its duties did not include the regulation of profit rates, environmental performance, social impact of the tariff on low income users (a tariff increase of 106 percent was applied uniformly to all users at the start of the concession, which triggered a massive mobilisation that eventually led to the cancellation of the contract) or monopoly behaviour (given the vertical integration of the company). The body was formally autarchic and was funded with a regulatory fee collected from the service's revenue; however, the regulator was intervened by the provincial executive on several occasions.
Bolivia, Cochabamba	The regulator SISAB was supposed to operate both as granting power and regulator of the concession, which attracted much criticism because of the game-keeper/poacher dilemma. The legality of the

[18] As one British engineer interviewed during the research put it, "this idea of unregulated private water monopolies is so removed from reality that I simply cannot see how it could possibly be implemented anywhere".

	framework implemented to grant the concession was also questioned from the outset given that the law appointing SISAB was passed in October 1999 but the concession had already been granted in September that year. The concessionaire was granted a monopoly of both water sources and WSS, and the analysis of the process of reform leading to it (1994-99) provides evidence of the lack of independence and low technical/administrative capacity for enforcement of the regulatory institutions. The concession was terminated in March 2000 as a result of public mobilisation against the law and the concession.
Brazil, Lakes Region	The regulator ASEPRJ was constituted in February 1997, after the bidding process started (June 1996) but prior to the start of the concession (July 1998). ASEPRJ is an autarchic organization with administrative, technical and financial autonomy (it is funded by the collection of a regulatory fee from the private operators) and is in charge of regulating all public services granted in concession in the state of Rio de Janeiro. It faced many challenges from its inception, including shortage of staff to comply with all its duties, had to endure intense lobbying from interest groups, and faced allegations of corruption and mismanagement. Since 2001 the body has been able to establish itself as an increasingly independent and efficient regulator.
Brazil, Limeira	The former municipal WSS utility SAAE was transformed into regulatory body at the time of the concession (1995). However, from the beginning it had no financial autonomy and was heavily indebted, being unable to effectively monitor the private operator. A contract renegotiation in 2001, which involved a 63 percent increase in the tariff, created a regulatory fee to fund SAAE's operation.
Brazil, Niterói	The regulator EMUSA lacks the technical expertise to monitor the private operator. Moreover, it has no financial autonomy and has very limited decision making power.

Table Nº 1b. The pattern of unregulated or poorly regulated private WSS monopolies

England and Wales	Although the original strategy of the Thatcher administration that carried out the privatization in 1989 was to minimize regulation, the actual process (driven by a number of converging forces including the impact of EU directives, internal dissent from technical experts, and pressure from the political opposition) led to a significant expansion of the public sector's regulatory capacity. Regulation is carried out by sector (OFWAT, Drinking Water Inspectorate) and inter-sector (Environment Agency, Monopolies and Mergers Commission) organizations that are largely autonomous, though not independent from the political system (as shown by the 1997 overhaul of the regulatory environment implemented by the incoming New Labour administration). Nevertheless, critics of the regulatory framework in place, and especially of the economic regulator OFWAT, claim that regulatory decisions have tended to systematically favour the interests of the private operators. In fact, formally the main duty of the regulator is to ensure the economic and financial viability of the private operators, while protecting consumers' interests is a lower priority.[19]
Greece, Athens	The government decided not to create an independent regulator to monitor compliance with contract. The company submits regular performance reports directly to the federal government (MESPPW). The judicial system is de facto the only institutional jurisdiction with authority over the concession in case of legal disputes, while economic or technical problems are examined by experts appointed ad hoc.
Kenya	The WSS regulator is part of the federal government (MWRMD, which is itself a major provider of WSS in the country). The system is marred by poor organisational structures, centralised management, excessive political influence and interference, uncertain and inconsistent policy regime and regulatory framework, and lack of autonomy and of clear definition of roles.
Mexico, Aguascalientes	CAPAMA, a public decentralized municipal body created in 1993 for the administration of the concession to the private operator. CAPAMA is both the granting power and the main regulator. In 1996 CAPAMA played a central role in the controversial "rescue" of the private operator from financial collapse. CAPAMA was transformed into CCAPAMA during the institutional reform and contract renegotiation of 1996.

[19] See, for instance, Schofield and Shaoul (1997); Shaoul (1998).

Summing up, the main trends observed in relation to the regulatory frameworks in the cases studied show that:

- the PSP concessions have often been created before a proper regulatory framework (or even legislation) was set in place; in some cases, the creation of the regulator was just a formal procedure to comply with the requirements of the IFIs related to financial support for public sector reforms but the actual commitment by governments with setting efficient and autonomous regulatory bodies has been very low, with few exceptions;
- •in most developing country cases studied the regulatory frameworks set in place are structurally weak owing to lack of financial resources or poor administrative or technical capacity; in most cases, regulation in practice has been ineffective, especially regarding the crucial issue of ensuring compliance with contract commitments by private operators;
- •also, in most cases the degree of autonomy of the regulator vis a vis political authorities and private operators is very low; even in cases like England and Wales, where there is a strong regulatory system in place, political interference has been a strategically important driver of crucial regulatory decisions affecting such issues as setting tariff levels or banning disconnection for non payment;
- •the development of regulatory structures that accompanies the expansion of PSP has gone counter one of the main arguments put forward to promote PSP in the first place: that PSP would allow the reduction of public sector bureaucracy. The evidence shows that there is an expansion of bureaucratic structures (the case of England and Wales is perhaps the best example), which is reflected in higher costs for the users (regulatory fees become an additional component of the tariff structure);
- •as a pattern, improvements to the regulatory framework and enhancement of the regulator's role have taken place belatedly, some times after several years (e.g. Buenos Aires in Argentina and Limeira in Brazil), and have been the result of mounting social and political pressures to establish stricter control over private operators; even then, when regulators seek to assert their autonomy and exercise their monitoring powers, their decisions have been often overruled by the political authorities (the case of ETOSS in Argentina being a paradigmatic example).

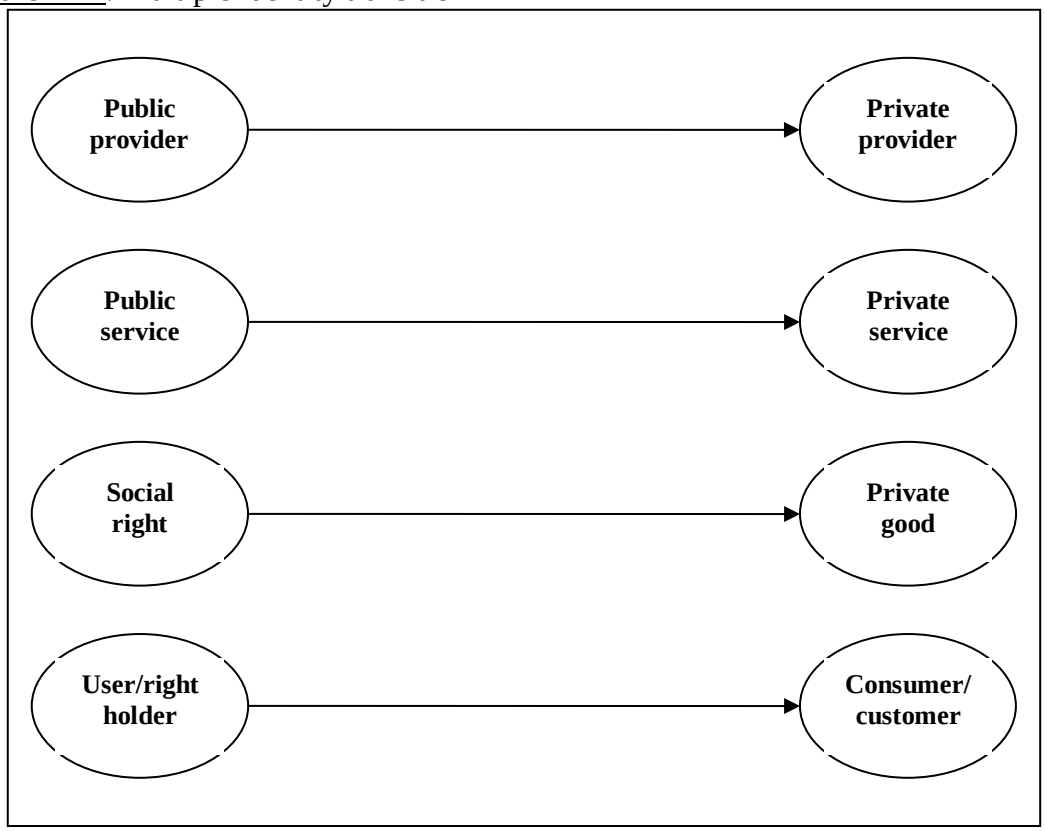
To close this section, it can be said that although in the cases studied there is formally a regulatory system of some description in place, the evidence shows that regulation is one of the weakest aspects of the WSS policies implemented after the mainstream pro-PSP model since the 1980s. For this reason, it seems sensible to reflect on the possibility that strict and truly autonomous regulation may have not been a priority for those actors promoting PSP in the water sector, a hypothesis that receives some support from the analysis of the arguments in favour of minimal regulation or self-regulation exposed by authors sympathetic with the mainstream model. I will come back

to this later on but let us consider now the next principle: the transformation of users into consumers and rights holders into customers.

From right holders to customers

The principle that the delivery of WSS should be converted into a private good, examined earlier, requires also the transformation of those actors involved in the process in a sort of multiple identity transition, as illustrated in Figure Nº 2.

Figure Nº 2. Multiple identity transition



It is clear that some of these transformations have been in progress much before the mainstream WSS policies examined in this project were conceived and implemented, as they are part of the more general process of commodification that increasingly transforms human relationships in all spheres of activity, including the governance, management and social distribution of water and WSS. It is also clear that one of the most negative aspects of this long-term process of commodification has been its effect on the poorer sectors of the population, who continue to pay much higher prices for normally substandard and often unregulated WSS. However, it is well established that the commodification process has been much slower in the water sector –especially in

networked WSS– than in other basic public services like energy, telecommunications, health, education, and transport where PSP has progressed at a faster pace.

In this regard, one of the explicit objectives of mainstream WSS policies has been to accelerate the transition from public service to private good, and the main efforts have been focused on transforming the identity of the service provider through the process of public sector reform and PSP expansion. Our hypothesis is that another important transition required by the model, that of right holder and user into consumer and customer has received much less attention, perhaps because it was assumed that this would be a sort of mechanical transition that would follow once the PSP-based system of provision was in place. We have gathered enough evidence to consider this hypothesis as plausible, and the overall trend suggests that pro-PSP reformers have been largely oblivious to the potential response that these policies would elicit among the population.

One particular example of this is the fact that "user participation", that is, the involvement of users in the process of transition did not rank very high in the mainstream WSS model until very late (late 1990s), when the recurrent failures of PSP experiences – often related to user dissatisfaction and opposition– demanded an urgent review of the model. However, as described earlier (see Boxes 3-8 and the section on conflicts later) the evidence emerging from the cases demonstrates that users and right holders have responded with a wide array of actions including the rejection through democratic vote of the policy that would transform WSS from right to commodity (Chaco in Argentina; Porto Alegre and Recife, in Brazil), presenting administrative complaints to the authorities (Aguascalientes, Mexico), civil disobedience (non payment of water bills as a political statement; Tucumán, Argentina), massive mobilisation (Tucumán, Argentina; Cochabamba, Bolivia), and exercising direct violence against the property of WSS operators (clandestine water tapping, destruction of water meters, occupation of buildings, etc; Mexico, Kenya, Brazil, Bolivia) or their employees (e.g. kidnapping of staff; Mexico), among others.

I will come back later to the problems arising from this attempt to transform the identity of water users by reducing them from right holders to commercial customers, as it is a central question in the discussion about the incommensurability of values underscoring water and other ecological conflicts worldwide. But first I want to examine the challenges facing the policies of PSP expansion in relation to problem of "user participation". In our perspective, the very limited user involvement in the governance of water resources and WSS observed in the case studies, as well as the conflicts emerging from the resulting widespread perception of exclusion, reflect the underlying tensions between formal and substantive citizenship, which I address next.

The tension between formal and substantive citizenship

In most cases examined, pro- PSP policies have in one way or another incorporated an explicit reference to the crucial importance of citizen involvement and participation for the success of the reform process. Unfortunately, in most cases too this has been simply a rhetorical device and meaningful citizen involvement, even in their role as individual customers, has been largely neglected in the process.

Text Box Nº 10. Water and citizenship

It is important here to remind ourselves of the basic connections that can be made between the social activities and institutions involved in the management and governance of water resources and WSS and the traditional categories of citizenship in modern Western political culture:

* water (property) rights can be considered as a specification of the civil right to own property, one of the basic rights of modern citizenship; civil rights also include the right to fair judicial procedures to exercise the right to own property;

* the rights and duties involved in the governance and management of water resources and services are part of the sphere of political rights; these involve the right to participate in decisions about how water resources and WSS should be governed and managed, by whom, and for whom;

* the universal right to essential water and sanitation services belongs in the group of social rights. It has recently (2002) been recognized by the United Nations as a universal human right;

* extended rights of citizenship came to include the right to information about how water resources and services are managed (for instance, compliance with environmental standards by water managing bodies, quality of water services, tariff setting criteria, allocation of benefits, and so on), and governed (availability and transparency of information allowing democratic accountability and control).

Source: Castro (2006), chapter 6.

However, in addition to the tension between formal and substantive citizenship, namely between the formal acknowledgement of the rights and their actual exercise, there is also a confrontation between different traditions of citizenship underlying mainstream water policy, which I examine elsewhere. For instance, in the liberal Anglo Saxon tradition citizenship is mostly restricted to the exercise of civil and political rights, while "social rights" are not considered to be a component of citizenship. In the extreme, for liberal thinkers social rights constitute an obstacle for the achievement of citizenship, which underscores their opposition to redistributive policies, state intervention or regulation of private activities. The recognition of social rights of citizenship is rather associated with, broadly speaking, socialist and communitarian traditions, which informed the social democratic ideals leading to the universalization of essential services such as health, education and WSS in the post Second World War period.

An additional layer of contradiction is added when policies developed in the context of Western political cultures are transplanted and transposed to developing countries, where they are adopted and adapted at best, or imposed with complete

disregard for local conditions at worst. Let us examine these contradictions in the light of the evidence provided by the case studies.

Water rights

As already discussed, the case of Cochabamba is the only one among our case studies where the rights over water resources were at stake, when the new water law passed in 1999 and the concession granted to a private consortium in the same year threatened to expropriate the existing water rights of the indigenous farmers of the Cochabamba Valley. In fact, indigenous water rights, based on what is locally known as "uses and customs", were neglected in the relevant policy reforms carried out in Bolivia during the 1990s such as the Basic Sanitation Plan (1992-2000). Moreover, by transferring all water rights to the private company, including those abstraction rights previously in the hands of Cochabamba's municipal operator SEMAPA, the expropriation would have also been extended to the whole community, which owns the water rights through the municipal body.

Water and sanitation services

As already pointed out, in formal terms enhancing citizenship has been an important rhetorical element in the process of public sector reform implemented in developing countries through the policies of decentralization and expansion of PSP. For instance, in Mexico the 1992 sweeping reforms were introduced in the water sector seeking to replace traditional clientelistic practices by a "new water culture" based on citizen involvement, community responsibility, and private sector delivery of services that had been previously a state responsibility. In Bolivia a Popular Participation Law was passed in 1994, seeking to promote more citizen involvement in local government affairs, and the creation of an inter-sector regulatory framework during the 1993-97 reforms allowed for citizen participation in the regulatory process. In the European Union, the European Water Framework Directive passed in the year 2000, which is being transposed into each country's national legislation, declares that "the success of this Directive relies on close cooperation and coherent action at Community, Member State and local level as well as on information, consultation and involvement of the public, including users" (European Union, 2000). It would not be difficult to extend the number of examples of this formal acknowledgement of the crucial importance of involving people in their roles of citizens and water users in order to achieve the expected results from the policies being implemented. Nevertheless, there is overwhelming evidence that in practice citizen involvement, even when people's roles are limited to that of customers, has been highly restricted in most cases, and particularly so in processes involving PSP in the water and sanitation sector. Let us examine some examples.

Argentina

Most concessions to private companies made during the 1990s in Argentina were carried out by-passing the congress (through the issue of special presidential "Decrees of Necessity and Urgency") and avoiding public consultation or citizen involvement, as it happened in 1993 with the case of Aguas Argentinas in Buenos Aires. Moreover, the concessions were granted in the absence of any antimonopoly legislation, specific regulatory bodies or consumer representation. In the case of Buenos Aires, successive renegotiations of the original concession contract followed the same model favouring the private company's interests over the public. In the extreme, even the regulator ETOSS was excluded from crucial negotiations in 1997 when the body tried to exercise some degree of control given the overt lack of compliance by the private company with its contractual obligations in relation to investment commitments.

Another crucial aspect affecting citizen participation in Buenos Aires is the monopolization of the production, access, and use of vital information about the running of the water utility by the private operator, which results in both the regulators and the users' organisations being dependent on the information released by the company, which leaves little room for independent assessment and monitoring. The role of users' organizations was only defined after the concession was granted and it was limited to presenting complaints, whether legal or administrative. After a review of the role of users in the face of mounting citizen unrest in the later 1990s, user involvement has been mainly limited to their engagement as providers of labour and materials for the expansion of the network in poor neighbourhoods, a programme that has been jointly developed by the company and international and local NGOs. Although these forms of "civil society" engagement were obviously a step forward from the alienation that users suffered in the original concession, they still have little say on the crucial aspects that constitute the governance of the water system, specially regarding decisions about who governs the system, how, at what cost, and for whom.

In the case of Tucuman, the overall process leading to the concession of the public utility in 1995 was marred from the start by lack of transparency and widespread suspicion of corruption of public officers and politicians. The negotiations were carried out in the absence of public debate or even consultation, and citizens were also excluded from the activities of control and regulation foreseen in the regulatory framework and the licensing contract. However, in sharp contrast with the case of Buenos Aires, the authoritarian character of the process in the end resulted in the early collapse of the concession. The increase of 106 percent applied to the water bills shortly after the private operator took control of the service provoked widespread unrest among water users and prompted the organization of a wide-ranging front of opposition to the privatization through a "refusal to pay" campaign that included municipal authorities, provincial legislators, and workers who had been laid off by the private company.

In addition, problems with the quality of water being delivered and the extreme high temperatures of the summer of 1995-1996 compounded the situation and the protest movement grew rapidly to the point that 86 percent of the users, including the business union Economic Federation of Tucuman and the provincial government joined in the civil disobedience by refusing to pay their water bills. One of the most symbolic protests was the "Bottle demonstration" carried out by the users against the private company and the

provincial authorities, which included piles of bottles placed in front of the government headquarters and a mock "legislative session" held in the central square representing scenes of the briberization —to borrow from Joseph Stiglitz (Stiglitz, 2002: 58)— that allegedly took place when the privatization law was passed. In the end, the private company took the case to the International Centre for Settlement of Investment Disputes (ICSID) and sued the Argentinean government for a compensation of US$ 300 million under the provisions of the Reciprocal Treaty of Investment Protection between Argentina and France. The company lost the case before the ICSID in the first instance, but it appealed and the negotiations continue in what has become a landmark case in international disputes involving PSP. In September 1997, the company and the provincial government terminated the contract and the services were resumed by the public sector.

Bolivia

The institutional framework for user participation in Bolivia has been limited to creating formal channels for the presentation of complaints and appeals about services' deficiencies and grievances. There is also a provision by which the regulator has the power to call public audiences for consulting users on particular issues. In general, these instruments have not helped to promote meaningful citizen involvement, as showed by the fact that a public audience held in Cochabamba in December 1999 to consult the users over the tariff increases to be implemented by the private concessionaire attracted only 14 participants. The evidence shows that, although the regulator was supposed to act in defence of users' interests, the prevailing perception among the population was that the interest of the private water operator was receiving priority over those of the community. These feelings were further accentuated because the municipality was also left outside the discussion over the tariff increases, effectively curtailing the only other mechanism available to citizens for exercising control over the process. Moreover, people had been alienated from the start, as the process leading to the granting of the concession had been conducted with complete disregard for citizens' preferences and opinions, in conditions of secrecy whereby essential information such as the contractual obligations and the financial plans of the private operator were hidden from public scrutiny through a confidentiality clause included in the contract.

Brazil

In the three case studies carried out in Brazil, Limeira (state of Sao Paulo), Niterói, and the Lakes Region (both in the state of Rio de Janeiro), the pattern has been very similar: the processes leading to the granting of the concessions were marred by political controversy, allegations of corruption, and long litigations in the judicial system. Against this background, it is possible to perhaps understand why the Director of the World Bank's Brazilian office, Vinod Thomas, declared in late 2003 that "when there is risk that privatization might create a monopoly, it is better to leave the services in State hands. [… he referred] to the case of Russia, a country that in the last few years has had one of the worst performances in social terms, as an example of privatization processes that should

have never happened (Thomas, 2003).” He may have probably been reflecting on the similar problems that were already affecting the process of PSP expansion in Brazil. Let us see some of the examples from our case studies.

In Limeira, for instance, the changes needed in the municipal law to allow the concession of the WSS to a private operator were implemented with disregard for the relevant legal procedures and by allegedly bribing opposition MPs to vote in favour of the reform in exchange for jobs and other benefits. An inquiry over the alleged irregularities that was launched under pressure from the media and from mounting public protests was shelved and the results were not divulged. However, the provincial Public Prosecution Office intervened and unearthed additional irregularities, in particular the fact that the concession contract had been ratified on the same date that the winning bidder had been announced, without making public neither the proposals of the other competitors nor the criteria used to select the winner. The evidence gathered by the Prosecutor also fuelled further allegations of bribery, which would have taken place to buy the vote in favour of the winning bidder. In January 2000 a judge declared the concession cancelled, but the private operator appealed the decision and won the case in the Supreme Court of Justice. Citizen involvement has been almost non existent in this case, which is also characterized by a very poor regulatory framework (see Table 1), and the overall process was largely hidden from public scrutiny. An important outcome of the Limeira conflict, however, is that the high profile of the political and legal struggles, which were amplified by the media, had the effect of delaying or canceling similar projects involving the introduction of PSP in water and sanitation services in other municipalities of the state of Sao Paulo.

The other cases examined present similar characteristics in important respects, being subject to fierce political and legal battles, lack of transparency in the bidding processes, and allegations of corruption. A crucial aspect shared in common by these cases is the secrecy involving the contracts, especially the lack of information about such issues as the authorized rates of return on investment or the details of the committed investment and financial plans, which renders regulatory monitoring and public scrutiny unfeasible.

England and Wales

Since privatization in 1989, protecting consumer interests was entrusted to the economic regulator OFWAT, which appointed regional Customer Service Committees (CSCs). The chairpersons of the committees jointly with OFWAT’s Director constituted the OFWAT National Customer Council, which represented customer interests at the national level. The consumer representation was restructured in 2002, among other reasons in response to criticisms that the CSCs were not entirely independent from the regulator. Since then, the organization has been renamed as WaterVoice, with ten WaterVoice Committees and a national WaterVoice Council. The committees are formally independent, though their members are still appointed by OFWAT’s Director. Notwithstanding these arrangements, which represent an important step forward from the situation reigning in most cases of PSP in developing countries, the leverage of the users within the internal governance structure of the water sector remains very limited.

In practice, citizens have been systematically excluded from key decisions, including the negotiations leading to the 1989 privatization, which was implemented despite the fact that opinion polls suggested that a large majority of the population opposed the initiative. After privatization, crucial information related to the internal workings of the industry that was previously in the public domain became hidden from public scrutiny in the name of preserving business confidentiality, as illustrated by our own research experience. The company RWE-Thames Water has its own documentation centre that can be consulted by the public, but we learnt from our interviews with the centre's staff that the unit does not longer receive copies of the internal documents produced by the water utility. Before privatization one copy of each relevant document produced by the company was sent to the documentation centre, but this practice was suspended after privatization and now most documents received in the centre are external to the company. This is consistent with other research findings about the culture of secrecy governing the management of information that is crucial for the effective monitoring of the private operators but that is inaccessible to the citizens and even to the regulatory bodies, which includes for instance essential data for estimating financial expenditure in system maintenance and improvement (Shaoul, 1998).

Greece

The management of the Athens water utility is not unfamiliar with political scandal and lack of transparency, which reached a peak during a prolonged drought in 1990-1993 when the environmental conditions were allegedly used to foster the government's political agenda and the company was accused of mismanagement and corruption. One of the reactions of the company at the time was to restrict information and data disclosure to reduce exposure and damage. After 1993, the company improved the availability and transparency of the information made available to "customers" and, since the introduction of PSP in 1999, to potential investors. A Public Relations Directorate was set up to this end, and the company publishes an Annual Statistics Report and an Annual News Bulletin for the Stock Exchange. However, the system has been criticized given that there is no external mechanism to check and validate the information provided in these reports. For instance, the critics point at the fact that the annual shareholders report for 2002 hides the actual financial situation of the company, which was significantly worsened because of the end of public sector subsidies and the lack of public financing for the investment program. In fact, the report does not provide any information about the progress made in implementing the investment program. Likewise, although the company is obliged by contract to produce an annual "consumers report" it has failed to comply with this requirement, despite the fact that formally the consumers' right to this information is protected by a "Consumers' Charter". Citizen participation has not been contemplated in any stage of the process and there is no independent regulator.

Kenya

A survey carried out in Nyeri, one of the two locations chosen for the case studies in this country, showed an overwhelming perception of exclusion among the respondents regarding the introduction of PSP in running their municipal water and sanitation system. The citizens became aware that WSS were now provided by a private operator through letters sent by the municipality informing that a concession contract had been signed. No consultation or discussion of alternatives took place before or after the negotiations, and the citizens were presented with a fait accompli. The same survey was carried out in the second location, Tala Town, and it threw similar results. However, in addition to the overall feeling of exclusion from the process leading to the introduction of PSP, citizens here complained about alleged irregularities in the tendering procedures. The interviewees openly spoke about their strong suspicion that corruption between the municipal authorities and the private provider would have been the main driver for granting the concession and not a genuine concern with improving the provision of WSS. Interestingly, although in Tala Town people were not even informed by the authorities about the ongoing negotiations to introduce PSP, 95 percent of the respondents showed high awareness about the process, which suggests the existence of a high potential for the meaningful involvement of the citizens.

Mexico

The policies of reform implemented since the 1980s in the country formally recognized the existence of protracted conflicts in the water sector and that any solutions must involve the users in solving the problems. Thus, in 1989 the government of President Salinas created the National Water Commission (CNA), a state body with the status of quasi federal secretariat, "to channel and solve without bureaucratism the different conflicts being generated with relation to the distribution, use and exploitation of water" (Presidencia de la República Mexicana, 1992: ii). The involvement of water users had already been envisaged by the 1981 National Hydraulic Plan, which had proposed the creation of integrated systems for water management to promote "a wider participation by the users in solving common problems" (Secretaría de Agricultura y Recursos Hidráulicos, 1981: 117). Since the late 1980s institutionalization of user participation was further established with the creation of the Co-ordination of Participation in the CNA, and the Under-co-ordination of Social Participation in the Mexican Institute of Water Technology (IMTA).

However, despite this formal recognition of the need for public participation in the governance of water and WSS, in practice the model implemented in Mexico during the 1990s did not promote the level of citizen engagement needed to bring about the much desired "new water culture" that the government claimed to promote. Although since the year 2000 the authorities have adopted a change in strategy and have intensified the creation of new institutional forms of public participation, the prevailing notion of "user participation" informing government policy fails to recognize the complexity of the process and its essentially political character. Thus, with few short-lived exceptions, most programmes launched by the water authorities in the name of social participation are in

fact build around the expectation that users would accept to become obedient customers, accepting decisions already taken by the technical and financial experts without consultation and debate, and more importantly demonstrating their willingness to pay their water bills punctually. In particular, the expansion of PSP in the Mexican water and sanitation sector has taken place with notorious disregard for the preferences and opinions of the citizenry.[20]

In the Aguascalientes case study, in addition to the pattern of poor of null citizen involvement in the negotiations and in the monitoring of the private operator, the research team has identified the emergency of a very original process, which could be termed "private sector clientelism".[21] Learning fast old tricks characteristic of traditional Mexican politics, whereby WSS became historically a fertile ground for political clientelism, the private operator has set up a regular meeting with users that takes place every Wednesday in the Zócalo, the main square where Mexicans gather for their traditional and civic gatherings. The event is called Citizen Wednesday and a representative of the private operator meets with users to discuss their grievances and problems, such as disagreements about water bills, arrears, or complaints about service quality issues (low pressure, intermittent service, etc.). However, the evidence shows that rather than providing a rational mechanism for the resolution of disputes the system has reproduced the old clientelistic practices that the introduction of PSP was supposed to eradicate and replace with a "new water culture". The decisions taken, such as the granting of discounts in the water bill or the lowering of the interest rate applied to accounts in arrears have been perceived by many users as being subjective and discretionary and have created new problems and widespread dissatisfaction.

When the exceptional happens

There have been important examples of what may happen when citizens are meaningfully involved in the decision making process or local authorities have some degree of

[20] The lack of citizen involvement in the expansion of PSP in Mexico was the recurrent topic throughout the Second PRINWASS International Conference that took place in Mexico City on 2-3 April 2003. We managed to bring together representatives of the government (from the National Water Commission, the Secretariat for Environment and Natural Resources, the Federal District administration, and also representatives of provincial and municipal bodies), the private sector (members of the Mexican offices of the Suez (Ondeo) group and representatives of national companies involved in the provision of WSS), academics, and user and citizen organizations. One of the most interesting moments of the debate took place when private sector representatives sided with NGOs and users' organizations in challenging the government officers that attended the conference to "change their authoritarian culture and start listening to the people". This comment followed a heated discussion between users' organizations from the city of Saltillo, state of Coahuila, and the representative of the CNA around the lack of citizen involvement in the negotiations leading to the concession contract granted to a private operator in that city. Most of the conference papers can be downloaded from the project's web site http://www.prinwass.org/documents.shtml.

[21] Clientelism is normally associated with politicians allocating public funds, for instance by providing free or under priced WSS, to win electoral support (see World Bank, 2003, chapter 5 "Citizens and politicians"). The introduction of PSP has been presented as an instrument to dismantle the old culture of clientelism and dependency and replacing it with the new culture of citizen responsibility and engagement.

autonomy to decide between alternative possibilities, free from the threat of loan conditionalities or the imposition of policies by the federal government. For instance, in a number of cases citizens from several Latin American regions have managed to exercise a higher degree of control over the water policies being implemented in their area than, for instance, their counterparts in the European examples examined here. In this regard, when the decision to privatize the water utilities in England Wales was taken in the late 1980s, opinion polls suggested that over three quarters of the population opposed the move, but the decision was taken nevertheless with complete disregard for citizens' preferences and without consultation. As already discussed, this pattern has been repeated in most cases studied here, whereby PSP projects have been implemented without citizen involvement or despite open citizen opposition to the policies. However, during our research we have identified a number of situations where citizens were given, whether intentionally or not, an opportunity to express their opinion and exercise a minimum degree of control over the process.

One such instance took place in the province of Chaco, Argentina, when in 1994 the provincial government called a public consultation on the acceptability of introducing PSP in the running of public services, WSS included. The result of the consultation, which was legally binding, took the political establishment by surprise (the most important political parties supported, or at least did not challenge, the federal government's far-reaching privatization programme of the time) as the voters massively rejected the PSP option and decided to keep public services in public hands. This decision was inscribed in the provincial constitution, which as a result forbade the introduction of PSP in its territory. Unfortunately for Chaco, the democratic decision taken by the citizens was punished by the federal government, which excluded the province from the national funding scheme for WSS infrastructure, partially funded by the Inter American Development Bank, as participation in the scheme was conditional on privatizing the water utilities (see Roze, 2003).

Other examples of what may happen when citizens have the opportunity to voice their opinions are provided by the participatory processes implemented in several Brazilian cities, such as Porto Alegre, in the South-eastern state of Rio Grande do Sul, and Recife, the capital of the state of Pernambuco in the Northeast of the country. The case of Porto Alegre is much better known (World Bank, 2004: 42; also, Viero, 2003), and therefore I will only refer here to the case of Recife. Since 1995 Pernambuco's Water and Sanitation Company (COMPESA) became a target for the PSP programme fostered by the federal government, and by 1999/2000 the preparations for launching a bid were already well advanced with the agreement of the federal, state, and municipal governments and with support from the World Bank through the Modernization Programme for Water and Sanitation Services (PMSS). In addition, a loan being negotiated with the World Bank for investment in basic infrastructure in the Recife Metropolitan Area was also tied up to the condition that the COMPESA were privatized. However, the unexpected electoral success of the Workers Party (PT) in Recife and other important municipalities of the metropolis changed the dynamic of the process, as the PT won the election with a programme that opposed the privatization of public services. In 2002, the municipal government of the capital organized Recife's First Municipal Conference on Water and Sanitation, opening the debate about the future of public services in the city –together with other crucial topics– in a highly participatory process

which led to a massive vote in favour of keeping public services, including WSS, in public hands (Rocha Ferreira, 2003). Faced with the outcome of the Conference, and with the determination of the municipal authorities to keep their campaign promises, the state governor accepted to freeze the bidding process. Nevertheless, further pressure was put on the municipal government to accept the introduction of PSP in the state utility COMPESA through the conditionalities included in the loan negotiated with the World Bank for the recuperation of degraded areas of the metropolis. It was only after very difficult negotiations carried out in Brazil and Washington, and after the intervention of the federal government of Brazil, that the bank's negotiators accepted to withdraw the conditionality of PSP from the loan contract as requested by Recife's municipal authorities.[22]

These are very relevant examples of what may happen when people are given a meaningful opportunity to participate and express their preferences and this is combined with a minimum degree of autonomy for the local authorities and regional governments. Unfortunately, as already observed this has been seldom the case in the mainstream policies promoting PSP in the water sector.

Summing up

It can be argued that although rhetorically social participation has been recognized as a crucial factor in ensuring the success of WSS policy reforms (European Commission, 2002, 2003; GWP, 2002, 2003; UNDP, 2003), the prevailing practices continue to alienate and exclude rather than include citizens in the government and management of these services. It is important, however, to place this critique in historical perspective. It must be recognized that citizen participation has not been a characteristic of the ways in which water resources and WSS have been governed and managed in the past. As pointed out by Dryzek, in the tradition of administrative rationalism, the highly technocratic model of public service delivery that prevailed during much of the twentieth century and that has been the target of the public sector reforms since the 1980s, the organizing principle was "leave it to the experts": citizens were expected to be passive and obedient beneficiaries (Dryzek, 1997). However, it must be also recognized that in the policies mainstreamed since the 1980s substantive citizenship continues to be excluded from the options available and the alternatives offered for people's involvement are limited at best to their role of passive customers.

In this regard, from the evidence gathered it emerges that "participation" often means willingness to accept decisions already taken with little or no consultation. This is not a new problem, and in most cases it could be observed that social struggles for the democratisation of the governance processes in the water sector and other areas of activity

[22] Interview with Eng. Antônio da Costa Miranda Neto, Secretary of Sanitation of the Municipality of Recife and International Representative of the Brazilian Association of Municipal Water and Sanitation Utilities (ASSEMAE), Recife, 12 December 2003. I have omitted the details of the negotiations for reasons of space, but the interview provided good evidence of the strength with which IFIs use loan conditionalities to foster PSP policies in developing countries. The final negotiations for this project, called Prometrópole, took place in Washington in November 2002, and the contract was finally signed on 23 June 2003.

are of long standing, as vividly illustrated by the experiences of the Latin American countries examined here. Despite a limited degree of success achieved during the 1980s through the experience of decentralization in some countries, the persistence of paternalistic, clientelistic and authoritarian political arrangements continue to hinder the possibilities for deepening the exercise of substantive citizenship and democratic governance.

Value incommensurability and social conflict

In the previous sections I have already pointed out the significance of the often conflicting traditions and cultural frameworks underscoring the ongoing transformations in the water sector and the frequent social conflicts arising from these policies. Schematically, I have considered a number of conflicting trends, including those involving:

- administrative and economic rationalism
- essentialist notions of "public inefficiency" and "private efficiency"
- free-market liberal and alternative (e.g. social democratic, communitarian) notions of governance and citizenship
- formal and substantive citizenship
- WSS as public/social and private good
- Western/developed country and developing country political traditions
- "old" and "new" water culture

A more in depth analysis would lead us not only to the extension of this list to embrace, for instance, the contradictions within both developed countries (e.g. between Anglo-Saxon and Continental European notions of state-civil society interactions or between the British and French business cultures seemingly leading the experiences of PSP in the global water sector) and developing countries (e.g. the cleavages within and between national and regional cultures and traditions), but also to explore the multi-dimensional and multi-scale character of these processes, from local to global. Although these tasks are beyond the scope of this work, it is important to remind ourselves of the complexity characterizing the socio-cultural frameworks and traditions at play, which has been largely neglected in the design and implementation of the mainstream policy models examined in this project.

In this connection, another frequent contradiction that can be discerned is between the constellations of values associated with water that has been observed among different social groups,[23] even in the developed country cases, and the standardizing valuing criteria which are intrinsic to the process of water commodification informing the mainstream policy model studied here.

[23] I have briefly summarised in Table Nº 2 some of these characteristics that were identified in our case studies with regard to the structure of values and interests associated with water.

Table Nº 2. Multi-dimensional water values (examples)

CASE	CHARACTERISTICS OF WATER VALUES
Argentina	Pre-Columbian indigenous traditions (e.g. in the province of Tucumán and North-western areas sharing the Andean cultural framework) attach symbolic values to water as a source of life, joy, and wealth. Also, like in the rest of Iberoamérica, Argentina inherited a rich water culture informed by Latin, Germanic and Arabic traditions that arrived with the Spanish colonisation, whereby essential water supplies were eminently considered to be a communal good that has priority over private and other uses.[24] In its life as an independent nation since the early nineteenth century, water has been widely conceived as a universal public good, which derives from a long-standing tradition of public-sector provision (in the Federal Capital WSS were universalized in the 1930s). In the provinces (e.g. Chaco) there is also a strong tradition of organizing WSS through cooperatives and local community systems. There is also a generalized notion that essential WSS should not be disconnected owing to non payment.
Bolivia	There is a divide between the modern Western cultural forms of institutional organization promoted from the state and the indigenous forms of water control and management based on "uses and customs" characteristic of the Andean cultures. The interaction between the two has traditionally taken the form of an ethnically based hegemony –often compounded by strong racism– that discriminates the culture and organizational forms of the indigenous population. The indigenous water systems include collective and individual forms of water rights, specific forms of authority that coexist and overlap with the state institutions, and very dynamic normative frameworks adaptable to changing natural and social conditions (i.e. changes in the availability of water resources, in water needs owing to population growth, migration, etc.). Symbolic and religious values attached to water are also an important characteristic alongside the material valuation of the resource. It is worth noting that material values are expressed in a diversity of forms, not necessarily in terms of Western-style market valuation systems.[25]
England and Wales	Perhaps it would seem counterintuitive to find in this case strong traditional values far removed from the framework of free-market individualism, but recent studies confirm the persistence of protracted cultural traditions associating water to religious and mystic beliefs and practices that have a strong impact on the behaviour of water users. To give an example, in some areas of southern England, families continue to bring their new born babies to the river headwaters for ceremonial rites that can be traced back hundred of years. There is also a deep-rooted belief among people that water should not be treated as a commodity but as a community resource, and there exist strong feelings against the

[24] See Appendix II. Figure A1 illustrates a cultural trait of the Islamic tradition, the *Zir*, a recipient containing water for the passers by that is offered free in the streets by landlords. In Islam, although water can be sold, it cannot be denied to those who cannot pay for it. Figure A2 illustrates the relationship with water for essential human use in Spanish culture.

[25] For a discussion of water values and systems in Andean societies, see Boelens and Hoogendam (2002). On the diversity of valuation languages found in ecological conflicts, see Martínez-Alier (2002).

1989 privatization of WSS (in the words of some local residents, "the worst thing that ever happened to us").[26]

Mexico — Mexico has a rich water culture resulting from the syncretism of indigenous water traditions and the Spanish heritage, itself a syncretistic outcome of Latin, Germanic, and Arabic water traditions. Water has been considered in all these traditions to be a common good, and community uses received priority over private or commercial uses, although these were also allowed. In the mid nineteenth century there was a large-scale privatization of land and water resources (most of which were previously in the hands of indigenous communities and religious orders), but this process led to the first social revolution of the twentieth century (1910-17), which was a revolution over land and water. The post revolutionary constitution reinstated that water is a public good, owned by the people through the state. This principle was formally abolished in the 1992 reforms to introduce commercial principles and PSP in the water sector, but the underlying water values are strongly rooted in the population.[27]

Often, these policies have taken the form of a pretentious experiment of social engineering assuming that cultures and values associated with water can be transformed by decree and through legal-institutional change. This happened for instance during the implementation of the far-reaching reforms to the water sector in Mexico, when the government announced in 1993 that "water has ceased to be a free good and from now on it is a resource which has an economic value, and society must pay for it".[28] However, things did not work out in that way, and people responded with a wide array of actions ranging from pacific bureaucratic demands and civil disobedience (e.g. non payment of water bills) to open and violent opposition to government policies through sabotaging water infrastructure (notoriously water meters), kidnapping water company employees, or destroying property. As one interviewee from the National Water Commission later put it, "these policies have not been totally accepted by the population and will need a period of maturation."[29] He went on to explain his view of what was happening in the ground:

> To charge for water, we need first to raise awareness among water users. But, imagine the case of a community that has been drawing water from a *fuente de*

[26] These were among the surprising results of a detailed ethnographic study carried out in the Stour river basin in Dorset between 1998 and 2000, which was funded by the privatised water utilities (Strang, 2004). The research also explored how people think about pollution, why anxieties about water quality continue to rise despite the traditional high performance of the water utilities in wastewater treatment, why users resist changing "profligate" patterns of water usage, and why relations between water users and the industry and its regulators are problematic.

[27] For an exploration of the concept of water syncretism in the Mexican case, see Castro (2006).

[28] CNA (1993), p. 11; see also Rogozinsky (1993; 1998). It is also important to point out here that assuming that water was free before these reforms is a fallacy, as for most people in Mexico water has already become an expensive commodity since long ago.

[29] Eng. Miguel Aguayo y Camargo, Chief of Rural Programmes and Social Participation, National Water Commission, Valley of Mexico Regional Unit (May 1997), quoted in Castro (2006).

> *vida* [literally, a source of life] such as a spring, a *noria* or a well since long ago. How can we pretend to go and start charging this people for that water without first explaining the reasons, without helping them to understand what we are doing and why? They feel that the spring is theirs, isn't it? Although the Constitution states that water belongs to the nation, how can anybody approach this community and say "Well, from now on you must pay for this water because it belongs to the nation." It will be very difficult to convince them! (Eng. Miguel Aguayo y Camargo, *op cit*.)

It has been very difficult indeed, and not just in Mexico, as already discussed. However, in this section I am trying to shift the focus from the specific problems arising from the attempt to transform water from public or "social" good into a commodity, to the even more problematic policies oriented at reducing the multi-dimensional values associated with water to a market equivalent. As the above-quoted interviewee put it, for local communities in Mexico, the spring that they have been using perhaps for centuries represents for them a "source of life", but the policy reformers wanted it translated into market values. This is not merely a technical problem –as some experts seem to understand it– that could be solved by carrying out an aggregation of benefits assessment, for instance by applying a survey among the spring's users to find out their "willingness to pay", and then use the results to estimate the spring's market value,[30] or as shown later through "stakeholder dialogue" to elicit consensus about paying more for water. However useful these techniques may be for providing criteria to support difficult policy decisions such as authorizing abstraction rights in endangered aquatic environments, the problem is that the results derived are often interpreted as representing people's perceptions on a range of dimensions that are irreducible to the market sphere.[31] Moreover, the actual usefulness of these techniques is cast into doubt when factors other than market-based efficiency criteria are introduced into the analysis to account for such issues as the conflicting cultural values and material interests held by different actors regarding issues of ecological sustainability and social equity.[32] Moreover, different languages of valuation in mutual conflict often reflect far deeper confrontations about the control and distribution –the very "stuff" of governance– of water resources, a struggle often fought through the deployment of alternative and often irreconcilable value systems.

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[30] This type of experiment, for instance, was carried out in the Thames Basin (England) to solve a dispute between the private water company and the environmental regulator over abstraction rights and environmental protection in the River Kennet, a tributary of the Thames, in which the regulator lost the case against the private company. For a discussion of the technical aspects surrounding the case, see Bateman *et. al.* (2000).

[31] In the case of England, as briefly summarised in Text Box Nº 2, this irreducible character of the multidimensional values associated with water was unearthed by another study funded by the private water industry that demonstrated the influence of social and cultural values in the behaviour of water users, which poses often intractable challenges to commercial approaches to water management (see Strang, 2004).

[32] For instance, see the analysis on the implications of applying one-dimensional cost-benefit analysis to the evaluation of alternative policy paths involving ecological distribution conflicts (Martínez-Alier, 2002).

Unfortunately, the mainstream policies promoting the expansion of PSP in the water sector have been largely informed by this one-dimensional thinking where market-based efficiency criteria override other considerations, including those of economic efficiency. An example in point is the interpretation given by pro-PSP reformers to the Fourth Principle of the Dublin Declaration adopted at the UN Conference on Water and the Environment (January 1992), which stated that "water has an economic value in all its competing uses and should be recognized as an economic good" (UN, 1992). The principle itself is quite ambiguous and leaves some room for different interpretations, but the following conclusions extracted from the principle illustrate the tendency towards market reductionism in mainstream water policy:

> finally, in the Dublin statement […] the rhetoric of international meetings on water resources management recognized that water is essentially an economic good. […] This is not a very new proposal. Economists interested in water resources management have long argued the necessity to recognize that water is an economic good and not to treat water as having "unique importance" but as one good among all others. […] If water is an economic good then it should be possible to govern its allocation through the market (Lee and Jouravlev, 1998: 7).

There has been a not-so-subtle displacement of meaning here, because recognizing that water has an economic value that has to be taken into consideration does not mean a) that this is the only value that counts and b) that, consequently, water should (could) be governed through the market. There is a double reductionism here: first the multidimensional values associated to water are reduced to the economic dimension, and second the economic dimension is reduced to the sub-dimension of market transactions.

Aware of the dangers and actual failures derived from the inability of mainstream water policy to deal with the challenges posed by conflicting values and interests, water experts linked to the large multinational private companies in a joint effort with practitioners and academics have suggested the need for more sophisticated assessments of "the range of valuing perspectives" characterizing human relationships with water. "Societies", we are told, "need to attach more importance to water, yet in recent times they have been reluctant to do so. In part this problem is due to different people or groups of people valuing water in different ways".[33] Leaving aside the controversial sweeping statement that societies are reluctant to attach more importance to water, the assessment of the problem of valuation offered by the paper is highly problematic in several respects. Despite the skilful description of the wide-ranging valuation systems and perception frameworks that they have identified in the countries where they operate, when it comes to the actual appraisal of the problem it soon becomes clear that what is been discussed is how to find a consensual mechanism (through dialogue) to negotiate the translation of "non market" into market values. The main problem, according to the authors, is "under investment in infrastructure, inadequate operation and maintenance, and inadequate funding for protection of natural water resources" (Moss *et. al.*, 2003: 7-8). The

[33] Moss et. al. (2003), pp. 7, 8. See also the presentation made by one the authors of the report at the Second PRINWASS International Conference in Mexico, in April 2003 (Wolff, 2003).

sustainable solution suggested is to create a "virtuous spiral" consisting in the recognition of the "full costs and benefits" to be derived from valuing water more, which in this case means willing to pay more for it. To hammer down the message, they quote the declaration made by an Indian Minister at the World Economic Forum in Davos 2000, who said "The people are willing to pay, the problem is that we politicians are not willing to charge them" (Moss *et. al*., 2003: 7-8). Another sweeping statement, in the light of the evidence discussed earlier.

In this connection, the results of market reductionism in water policy have been often catastrophic, as already exemplified with the paradigmatic cases of Cochabamba in Bolivia, but also in Argentina, Mexico, and other countries. By catastrophic I do not only mean the painful impact of failure on the countries involved, which is the most obvious consequence if we think in terms of their chances for achieving the MDGs. It has been also catastrophic, from a certain perspective, for the private operators that have ventured into the programme of PSP expansion often with very limited knowledge and understanding of the local socio-political and cultural conditions. As a recent assessment by the Executive Vice-President of Suez put it,

> I would like to have a brief look back at 2002 and 2003, whose disastrous results shook our convictions to the core: The overly hasty expansion of water internationally ended in failures that were painful for all of us; ONDEO and SITA's acquisitions of companies that should have been sources of growth instead generated losses or were a cause for concern. We were forced to pull out of unprofitable projects (Puerto Rico, Atlanta, etc.) and to sell part or all of companies such as Northumbrian and Cespa, whose development we were no longer able to finance. This sorely tried our nevertheless proven business models and our certainties (Chaussade, 2004).

This experience of business failure is shared by others, to the point that the global water operators have been rapidly retreating from developing countries. In the words of a recent analysis, "Can anyone imagine investing hard currency in water projects in countries like the Philippines, Argentina and Bolivia now?" (Global Water Intelligence, 2004.) This question provides an insight into the assessment that global water companies are making about the role that they can play in helping developing countries to achieve the MDGs.[34] It also provides, *mutatis mutandi*, a contribution to our own evaluation of the claims made in mainstream WSS policies about the role of the private sector as a key provider of much needed investment for developing countries.

Nevertheless, and to keep our discussion on track, the particular forms of PSP expansion implemented in the water and sanitation sector of developing countries since the 1980s has also elicited strong reactions among the citizenry of these countries, which range from disappointment to outright contestation. For instance, recent evidence

[34] Another example was provided by the Corporate Social Responsibility Director of RWE-Thames Water, who stated that the company no longer has plans to invest in water projects in developing countries (Aylard, 2004). See also Global Water Report (2004) about RWE-Thames exit strategy from water projects in China and other countries.

produced by the regular survey of public opinion in Latin America suggests that the already low acceptance of PSP policies among the public of the region has been worsening in recent years. Table Nº 3 shows the results per country and also the total average for Latin America.

Table Nº 3. Evolution of public support for PSP in Latin America* (1998-2003)

	1998	2002	2003
Costa Rica	60	32	-
Brazil	51	38	33
Venezuela	51	38	32
Mexico	49	28	31
Chile	51	22	29
Honduras	47	34	25
Colombia	39	23	24
Paraguay	46	19	23
Peru	44	32	22
Ecuador	52	40	20
Nicaragua	46	30	20
Bolivia	49	23	19
Guatemala	62	29	16
Uruguay	29	16	16
El Salvador	54	35	15
Argentina	32	14	12
Panama	20	31	10
Latin America	46	28	22

Source: Lagos (2004).

* Percentage of positive responses to the question: "Do you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with each of the following phrases that I am going to read: The privatization of state companies has been beneficial to the country." The table only shows results for the responses "Strongly Agree" and "Somewhat Agree".

Although some analysts have tried to dismiss the evidence suggesting growing dissatisfaction with PSP, which –and more worryingly– is also associated with a growing disenchantment with the democratic political system,[35] the figures project a strong pattern

[35] According to the Latinobarómetro survey, between 1996 and 2003 there has been a decrease in the support for democracy in 14 out of the 17 countries covered by the study. Among the countries studied in PRINWASS, the figures were: Argentina from 71 percent in 1996 to 58 percent in 2003; Brazil from 50

which is similar for most countries and is consistent with the findings discussed in this document. This development also offers strong counterevidence to another claim made in the mainstream WSS literature that we examine in our project: that the expansion of PSP would promote democratization in developing countries.

Conclusion

This report has covered a number of aspects that we have addressed from what can be called the socio-political and cultural dimension of PSP in the water and sanitation sector. In the first place, I have explored the significance of the political dimension for evaluating the expansion of PSP in the water and sanitation sector since the 1980s. Although mainstream WSS policies have been often presented as a kit of politically neutral policy instruments and as the logical path to be followed by developing countries in order to solve their chronic water and sanitation problems, the principles on which these policies have been grounded are essentially political as are the processes through which they have been "enabled" and set in place.

In this regard, these policies have been structured around a core set of principles inspired by neoliberal ideals of self-regulating water markets, whereby water and WSS are converted into private goods and their circulation operated in the absence of –or if this proves unfeasible, with as little as possible– state intervention in a free exchange between private providers and buyers. There is no need for citizens in this model, as market transactions belong in a different sphere whereby the only recognized rights are those stated in the relevant private contract between supplier and customer. Social rights or such notions of public interest or common good are therefore also excluded from this system, and the concept of user participation, belatedly introduced during the 1990s, in practice is redefined as willingness to accept the policies dictated by the relevant experts. As discussed earlier, although some of these questions seem to be far removed from the actual processes that have been observed since the 1980s, it is clear that WSS have been largely influenced by these principles, although they have not been consistently applied and there was no monolithic consensus about their validity even among the main actors that embodied the model, namely the governments of the OECD countries, the IFIs, the global private water companies, and sympathetic sectors among the ruling elites in developing countries. Still, cases like Cochabamba, Tucumán, Buenos Aires, among other examples reviewed in this project, bear witness to the fact that regulation of the private operators was not a priority for the designers and implementers of these policies, and when state control and intervention were finally introduced it was systematically the result of the widespread conflicts elicited by the implementation of the model. Likewise, substantive citizen participation has been systematically excluded from the agenda, and the design and implementation of the policies facilitating and introducing PSP have been carried out with complete disregard for citizen preferences and opinions, often through undemocratic or even illegal procedures.

percent to 35 percent; and Bolivia, from 64 percent to 50 percent. Mexico has remained stable at 53 percent (Lagos, 2004).

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At the heart of the socio-political processes examined here is the confrontation between alternative models of governance, structured around competing principles, which in the current historical stage took the form of a confrontation between a revival of market-centred –or market driven, to borrow from Leys (Leys, 2001)– governance against the pre-existing model of state-centred governance that had prevailed in the water and sanitation sector for most of the twentieth century. In this regard, one of the crucial questions that need to be answered is what were the theoretical, historical, and empirical grounds supporting the notion that the failure of state-centred governance in the WSS of developing countries[36] could be solved by radically transferring the role of the state to monopoly private companies. The evidence gathered in the project work leaves little doubt that there was scant historical support for these arguments, and the new evidence produced about the most recent wave of PSP in the water and sanitation sector strongly disproves the claims that the chronic WSS problems facing developing countries can be resolved by relying on the private sector. In this regard, the evidence is very consistent, whether we look at the socio-political aspects like I do here or at the economic-financial, socio-economic, demo-geographic, and even techno-infrastructural dimensions of PSP expansion in the water and sanitation sector since the 1980s as addressed by other project reports.

Nevertheless, this has been a highly dynamic process, with frequent changes in direction and a very unclear horizon in terms of where will the system move next. On the one hand, despite the arrogant neglect of citizen preferences and opinions, especially but not only in relation to poor country citizens, there has been mounting dissatisfaction and open defiance to the PSP policies in many countries. It would be a mistake to explain this opposition as a mere rejection of market policies or PSP, as in fact there was some degree of support among important sectors in the early 1990s, for instance in countries like Argentina. However, the convergence of, among other issues, undemocratic decision making and implementation and lack of participation, the widespread perception of public and private corruption in the negotiation of concession contracts, and the increasing evidence that the PSP model privileges the interests of the private operators rather than the needs of the communities, contributed to the observed marked decline in acceptance or at least tolerance of PSP and to the mushrooming of public protest, civil disobedience, and even violence against the model.

There a re many other elements that we have considered, such as the multidimensionality of values and cultural factors affecting WSS, not just in developing countries, but will not repeat here for the sake of clarity and brevity. Let us close this analysis by emphasising some of the key lessons that can be learnt from this experience in order to think ahead and contribute to the positive construction of feasible alternatives. In this regard, I have insisted in the need to give centrality to the political dimension for understanding the historical success of past WSS policies, which achieved universal

[36] Although the reasons for this "failure" are subject to strong controversy, which I cannot review here, we accept that there has been a failure in that even in countries where the economic and financial conditions would have allowed the achievement of universal –or quasi universal– coverage for safe WSS, this objective was not pursed by the state or it was abandoned at some point during the post Second World War II period. For instance, Argentina had achieved full coverage in the Federal Capital during the early 1930s, but the history of WSS after then has been one of decline.

coverage on the basis of principles whereby social rights and the common good were given priority over market interests. These policies and the principles that inspired them were accepted and supported by a wide range of social and political forces, even by sectors that in other respects defended free-market liberalism but accepted that WSS required different arrangements. It is our hypothesis that achieving success in the design and implementation of present and future WSS policies as those required to meet the UN Millennium Development Goals (MDGs) can only be achieved through the amalgamation of a similarly broad and universalistic set of social forces, not just composed by the illuminated elites but also able to incorporate the large sectors currently excluded or marginalized. The good news is that these processes are already taking place, however imperfect or limited they might be. Critically supporting them and contributing to their multiplication and expansion is also an intensely political endeavor.

Appendix

Appendix I. Table A1. Sequence of policy reforms and PSP events in the case studies

YEAR	COUNTRY	KEY POLICY	PSP EVENT
1972-82	Tanzania	"Decentralization" programme actually consisting in regionalization and centralization, abolishing local government authorities	
1974	England and Wales	Water Act regionalizes WSS by collapsing thousands of small utilities into 10 basin-wide Regional Water Authorities	
1980	Greece	The Athens WSS utility that had been in private hands through concession since 1928 becomes a "corporatized utility" directly dependent of the federal government. In the rest of the country WSS are run by municipalities.	
1980	Argentina	Decentralization of WSS from federal to provincial level	
1982	Tanzania	Local Government Acts to reintroduce local government authorities (abolished in the 1970s)	
1983	Mexico	Reform to Article 115 of the Constitution introduces municipalization of WSS	
1983	England and Wales	Water Act further curtails local authority involvement in the governance and management of WSS	

1984	Tanzania	Constitutional reform sanctioning the reintroduction lo local government authorities	
1985-1989	Bolivia	First stage of the Structural Adjustment economic reforms preparing the ground for PSP expansion	
1986	Kenya	Announcement of decentralization and commercialisation of WSS, supported by the German Agency for Technical Cooperation (GTZ)	
1988	Brazil	1988 Constitution introduces decentralization and municipalization of WSS	
1989	Argentina	Federal State Reform Law promoting full-scale privatization	
1989	England and Wales	Water Act creating 10 privately owned WSS utilities to replace the Regional Water Authorities.	In the Thames basin, including the London Metropolitan Area, Thames Water plc is appointed for 25 years (there is no bidding process) to replace the Thames Water Authority
1989	Mexico	Creation of National Water Commission (CNA); launching of "New Water Culture" to cancel notion of public good and introducing market framework in WSS	
1990	Brazil	Creation of the Modernization Programme for the Sanitation Sector (PMSS) with World Bank funding, oriented at promoting PSP	
1991	Argentina	PRONAPAC Plan launched by federal government to fund water and sanitation works, with support from the Inter-American Development Bank (IDB). The plan conditioned loans to the privatization of the provincial WSS.	

1991	Bolivia	National Basic Sanitation Plan, part of the measures envisaged in the Structural Adjustment reforms, with explicit reference to privatization plans for WSS	
		Creation of the Ministry of Urban Affairs, including a National Basic Sanitation Department (DINASBA) aimed at enhancing the institutional importance of WSS	
		Specification of functions for Water Administrative Entities in the Basic Sanitation sector, opening the field for PSP in WSS	
1992	Mexico	Reform to Article 27 of the Constitution to allow creation of land and water markets	
		New Water Law promoting PSP	
1993	Mexico	Aguascalientes State Water Law reformed to allow PSP in WSS	Concession contract of Aguascalientes City WSS for 20 years. The contract was revised in 1996, reducing the investment commitments of the operator and extending the period to 30 years
1993	Argentina	Law 6445 in Tucuman province allows privatization of WSS	
1993	Argentina		Buenos Aires Metropolitan Area WSS are granted in concession for 30 years.
1993-1997	Bolivia	"Second generation" Structural Adjustment reforms, based on large-scale privatization and decentralization.	
1994	Argentina	Chaco province seeks to reform the provincial constitution to allow privatization. The electorate votes massively against and privatization of WSS is	

		forbidden by the provincial constitution. As a result, Chaco is excluded from the federal PRONAPAC plan launched in 1991 with IDB support.	
1995	Argentina		Tucuman province's WSS granted in concession for 30 years. The contract was cancelled in 1997 owing to ongoing conflicts over the quality and affordability of the service. The concessionaire sued the federal government of Argentina before the ICSID for 300 million dollars, and the litigation continues.
1995	Brazil	Federal Law of Concessions promoting PSP	
1995	Brazil		Services concession in Limeira (Sao Paulo state) for 30 years
1996	Greece	Federal Law for the Modernization of Public Utility Companies promoting PSP. Athens' WSS utility becomes an autonomous public company.	
1997	Brazil	Rio de Janeiro State Complementary Law 87 allowing PSP in WSS Opening of bidding process for the privatization of the state's water utility CEDAE, condition required as part of the State Reform Programme negotiated with the IMF by the Brazilian government	Following a series of legal battles through 1997 and 1998, the state government excludes CEDAE prom the state's privatization programme in 1998.
1997	Brazil		Services concession contract in Niterói (Rio de Janeiro state) for 30 years. Although the contract was signed in 1997 in was not started until 1999 owing to the legal disputes surrounding the failed privatization of the state's utility CEDAE.
1997	Tanzania	Regional Administration Act sanctioning decentralization process. Legal reform to promote PSP in WSS. National Urban Water Authority	

		(NUWA) transformed into Dar es Salaam Water Supply and Sewerage Authority (DAWASA)	
1998	Brazil		Services concession contract in Lakes Region of Rio de Janeiro state (inter-municipal body) for 25 years
1998	Kenya		Service concession contract in Nyeri Town for 20 years
1999	Kenya		Service concession contract in Tala Town for 30 years
1999	Greece		Athens' WSS utility EYDAP is opened to PSP by a process called locally as "equitisation": a minority part of the companies shares is floated in the exchange market, 39 percent initially with the prospect of further expanding PSP
1999	Bolivia		Concession granted for water resources and WSS in Cochabamba. The concession was ended few months later (2000) after a massive mobilisation of the population demanding its cancellation.
2003	Tanzania		After several failed bidding processes (1999, 2000-2001), a 10-year lease contract for WSS in Dar es Salaam was signed.

Source: Elaborated from PRINWASS' case studies.

Appendix II

Picture Nº 1. The *Zir*, a clay recipient containing free water for the passers by. Islamic water tradition.

Source: Cairo, May 2004. Author's archive.

Picture Nº 2. Untitled.

Source: Barcelona, June 2004. Author's archive.

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D20 – Cross Comparative Report

Economic and Financial Dimension

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ARTICLE 2

Cross Comparative Report on the Economic and Financial Dimension

Economic-financial dimensions in the provision of drinking water and sewer systems. Preliminary considerations based on a heterogeneous group of international experiences

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Introduction

Towards the end of November 2002, the Committee for Economic, Social and Cultural Rights at the United Nations released a document stating that the access to adequate amounts of drinking water for personal and domestic use is a *fundamental human right*. In its General Commentary Nº 15, related to the statements in Articles 11 and 12 of the International Pact of Economic, Social, and Cultural Rights, the committee pointed out that "the human right to water is indispensable for living a dignified life. It is a prerequisite for fulfilling other human rights." In this aspect, it is not surprising that a few days after the World Health Organization considered that the declaration was "a step without precedence" that would contribute to achieving the United Nation's goal of reducing by half the number of inhabitants across the world who do not have access to drinking water and sewer systems by 2015. Without a doubt, this is a major international challenge, especially taking into account that "more than one billion people do not have access to drinking water, and more than 2.4 billion do not have access to adequate drains and sewer services" (Brown, 2003).

This goal has tremendous significance in the fields of health and quality of life: studies available show that more than 6,000 children die every day across the world from diseases transmitted through wáter (see also World Health Organization-UNICEF, 2001). In addition, the complex and diverse gamut of positive externalities of meeting this goal (in terms of the environment, of managing water resources, of the economies´ competitiveness, etc.) make this objective one of the most important initiatives of the 21st century. The additional requirements in terms of investment (and financing) are certainly significant. To achieve this goal, it would be necessary to invest around 17 billion dollars per year to satisfy the demand for drinking water, and an additional 32 billion for sewer systems and drains (Third World Water Forum, 2003). The necessary investment for achieving the objective set by the United Nations would involve over 56 billion dollars

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from 2000-2015 in Latin America and the Caribbean alone, involving an annual capital formation of around 3.75 billion dollars; depending on the country, this would represent between 0.1 and 2.1% of their annual projected Gross National Product (GNP) (Inter-American Development Bank, 2003).

Without a doubt, meeting this goal would be a serious challenge (whatever the type of drinking water and environmental sewer services´ management system – in brief, public, private, or mixed). Factors related to this challenge include the financing for expanding the networks, obtaining growing levels of micro measurements, the economic sustainability of the drinking water and drainage systems, the renovation of existing infrastructure, the rehabilitation and upkeep of equipments, etc. It is important to note that, unlike other public utilities, water is not a sector in which technological advances move at the same speed as in other areas (like that of telecommunications or even electric energy). Thus the life span of fixed assets in water is relatively superior: the elevated density of capital involved in the water pipe and draining networks also leads to capital costs that usually have a much higher relative gravitation, always in comparison to other public services via networks. In this sense, the issue of alternative financing infrastructure schemes acquires particular importance, especially in terms of expanding the service.

This objective is even more critical considering that the majority of the people who do not have access to drinking water and/or sewer systems include the neediest members of society: thus, they are also those with the least possibility to finance and repay the costs of expansion and rendering of such services. Although the universalization – or at least, the consolidation of a solid and consistent tendency towards this goal – should not be considered simply a utopia, the economic and financial issues are doubtlessly the most difficult to solve.

Whether these services are managed in the private sphere (with the necessary attention to the economic-financial balance required by the "market"), as a public license (state or municipal, with the resulting assignment of fiscal resources), or under a mixed scheme, the complex economic and financial issues are – and will continue to be – a subject for debate. This debate must transcend the ideological-political components that often accompany the topic – and often distort the real issues. These real issues are related to offering greater levels of service access while respecting the basic principles of equity and social solidarity.

This is particularly true in countries with relatively low levels of development, which show the highest levels of unsatisfied demand. In addition, in many cases these countries have undergone rapid (and often chaotic) processes of transference of public utilities to the private sphere without establishing solid regulatory institutions. It is important to add another item that is both obvious and decisive for the issue at hand: the low income levels of sectors with minor resources and the existing regressive patterns of income distribution, in addition to the limited resources that these countries possess. This is a critical factor in terms of expanding services for drinking water and sewer systems. There are many specific issues to deal with, and on several different levels – the degree of coverage, the quality of services, levels of poverty and social exclusion, etc. However, in spite of these different variants, analysing the economic and financial sustainability of the water and sewer systems of these countries is undoubtedly a complex phenomenon that involves all countries together.

Ultimately, it is about accessing an ideal scenario of auto financed systems, in which the revenues for rendering the services can then finance the costs of maintaining and improving the existing infrastructure. At the same time, this would also provide the capital costs that are needed to extend the current service coverage, the costs of improving the quality of the water and the treatment of the drain flow, and reasonable profits for the investors (or at least systems that no longer draw on fiscal resources, in the case of systems managed by the government).

Based on a complex and heterogeneous (in terms of scaling, development levels of basic infrastructure and of the economies themselves, service management models, successes and failures, etc.) group of international experiences involving Africa, America, and Europe,[3] the following sections will confront some of the central issues of the field. When combined, these issues can contribute to offer a series of analytical elements to address the economic-financial aspects necessary to evaluate whether the objective proposed by the United Nations is viable, or not. In addition, the analytical objectives and proposals of the PRINWASS will also be analysed.

Issues related to financing, criteria for service rates, cost structure, revenue margins for the companies rendering the services, the range and orientation of investments, and the principal economic and social impacts will thus be the object of a comparative analysis. This analysis will lead us to certain considerations and analytical tools that will contribute to the debate on the future of providing this basic component of human rights: drinking water and environment sewer systems.

There are some restrictions imposed by the type of basic information available and the difficulties to access solid comparative indicators that allow the development of a global vision of the problem integrating the international experiences reviewed. However, this document develops an exploratory analytical exercise geared to confronting certain basic issues with respect to the economic-financial perspective associated to the rendering of services, the economies (or group of economies) in which such services are possible, and the integration of drinking water services and sewer systems.

Financing sources

In general terms, we will consider an ideal situation in which the resources needed for the rehabilitation, maintenance and exploitation of the existing networks, as well as the expansion of service coverage (and the possibility of revenues for companies) complement each other in an adequate manner. In this scheme, the origin of incomes for licensee can have different sources: billing for services, local or international loans, direct or indirect subsidies by different governmental departments, and the contribution of

[3] The cities and regions included in the study are: the metropolitan area of Buenos Aires and Tucumán (Argentina – 9.2 million and 1.3 million inhabitants, respectively), Athens (Greece –3.1 million–), Aguascalientes (Mexico –600 thousand inhabitants–), Cochabamba (Bolivia –close to one million–), Lahti, Kangasala, Lapua, Nurmo, Kuortane and Kauhava (Finland –approximately 115 thousand–), Limeira, Niteroi and Prolagos (Brazil – in total, a little less than one million inhabitants–), London (England –7.2 million–) and Nyeri and Tala Town (Kenya –less than 150,000 inhabitants–).

resources ("fresh" capital contributed by shareholders – or by the government itself, in cases in which the services are being managed by the government – or reinvesting profits).

In this respect, given the fact that it is impossible to obtain homogeneous information with regards to the total resources of companies rendering such services in the different international contexts of this analysis, we have decided to focus on the topics that show similarities or discrepancies among the different operators in terms of the diverse possible financing sources.

On the one hand, there is an almost ideal analytical situation in terms of the information available on the financing of the firm Aguas Argentinas S.A. (service licensee in the city of Buenos Aires and part of the suburban area) after nearly nine years of administrating the service (Table Nº 1). On the other hand, and to a lesser extent due to some restrictions in terms of a greater disaggregation of the company total profits, there is some information available from the British operator Thames Water Utilities Ltd. (Table Nº 2). The economic and accounting data gathered for the remaining cases of the study limit the possibility of achieving a full information consolidation and comparison. In these cases, then, we must recur to specific references in which trustworthy information is available on the financing components.

In the first case, as can be inferred from the following study, which was the basis for this research,[4] the relative weight of the net increase of third party financing exceeded 15 percent of the total of funding sources,[5] whilst at Thames Water Utilities Ltd. this financing was under 4 percent. As mentioned above, it is critical to take into account other important variables (for example, the capital contributions of shareholders); however, the revenues produced by billing for water services seemed to easily be the almost exclusive source of financing for this operator.

[4] As noted by Azpiazu and Forcinito (2002 and 2003), Aguas Argentinas S.A. is the case of an enterprise with typical characteristics of a project finance, in which there is a minimal contribution of the firm's own resources combined with an excessive recurrence to third party financing, particularly from abroad.

[5] Aguas Argentinas S.A. achieved a focalized financing strategy in terms of accessing almost exclusively international funds at interest rates (of approximately 7 percent) much lower than those obtained in-country. These were equivalent to one third of the profitability on patrimony of the licensee, and did not take into account the implicit risk of monetary devaluation. At the beginning of 2002, when the Public Emergency Law and Exchange Regime Reform Law (Law 25.561) was passed, this led to an unsustainable financial situation in which Aguas Argentinas S.A. was forced to declare itself in default. At this point, the firm's foreign debt was close to 650 million dollars, with payments of close to 215 million dollars scheduled for 2002 and 109 million for 2003; after the devaluation, however, the firm's total income reached just 170 million dollars. For more on the debt policy applied by Aguas Argentinas S.A., see Azpiazu and Forcinito (2004) and ETOSS (2003).

Table Nº 1. Origin of funds at Aguas Argentinas S.A., May 1993-December 2001 (in millions of pesos/dollars and percentages)

Origin	Amount	Percentage
Income from invoicing	3,640.2	78.1
Net loan increase	706.1	15.2
Contributions from partners	120.0	2.6
Other financial income	140.0	3.0
Other	54.0	1.1
Total	4,660.3	100.0

Source: The information on the table is based on data from the Economic Ministry – Commission for the Renegotiation of Public Works and Utility Contracts (2002).

On the other hand, even though there is no detailed invoicing information on different types of services for Aguas Argentinas S.A., in comparative terms, all factors indicate that the proportion of income for water is much higher than that of sewer systems (given the fact that the coverage of drinking water is much higher than that of sewer and drains, although the rates are the same). The opposite occurs in the case of Thames Water Utilities Ltd., where the latter represents 36.7 percent of the funds from rendering drinking water services.[6] Another aspect that is important to note is that in the case of both operators (and in contrast to a great part of the other international experiences analysed here), no public subsidies are involved.

Table Nº 2. Origin of funds at Thames Water Utilities Ltd., April 1999-March 2003 (in billions of Sterling pounds at the 2002-2003 rates and percentages)

Origin	Amount	Percentage
Income from water services	2,335	40.7
Income from sewer services	3,191	55.7
Total income	*5,526*	*96.4*
Net increase of debt	.205	3.6
Total	5,731	100.0

Source: The information on the table is based on data provided by OFWAT (2004c)

[6] This is related to the fact that the firm covers the totality of the basin of the Thames River (which includes the city of London, among others). As a result, the number of clients for the sewer system is much greater than that which needs drinking water, since Thames Water Utilities Ltd. is the firm that covers drains and sewers in the total river basin, but the distribution of water is also covered by other companies (especially in the area of London: according to available estimates, the number of sewer service users in 30 percent more than that of drinking water –Castro, 2003–). When combined with the rate structure (Section III), this can help to explain the reasons for the income from sewer system invoicing being much higher than that of drinking water.

One example that differs substantially from both the English and Argentine experiences is that of mixed operator EYDAP, which offers service in Athens.[7] In this case, in the category of "other income" (comprised, essentially, of a state subsidy equivalent to 44 million Euros per year) represents nearly one fifth of the firm's financing, even exceeding the income from sewer service invoicing (Table Nº 3). As noted by Kallis and Coccossis (2003), the company has not recurred to external financing sources; to a large extent, this phenomenon could be related to the considerable state contributions received as subsidies.

Table Nº 3. Origin of funds at EYDAP, 1998-2001 (in billions of Euros and percentages)

Origin	Amount	Percentage
Income from water services	761	61.8
Income from sewer services	232	18.8
Other income (including public subsidies)	239	19.4
Total	1,232	100.0

Source: The table is based on information taken from Kallis and Coccossis (2003).

One element in which the EYDAP experience could be similar (although to a lesser extent) to that of Aguas Argentinas, S.A. is the marked discrepancy between the income from the provision of drinking water with respect to sewer services (the latter represents less than one third of the former). In this sense, the case of Thames Water Utilities Ltd. is quite representative (see footnote number 8) as is another one of the cases analysed here, that of LV Lahti Water Ltd. (municipal company in Finland: in 2001, 34 percent of the income at LV Lahti Water came from water service invoicing, while 58 percent came from sewer system services and 8 percent from other services). In the remaining examples in which information is available, the income from water services are comparable (this is the case of Brazilian company Aguas de Limeira S.A.) or slightly higher than that of sewer services (in the case of another Brazilian firm, Companhia Águas de Niterói, two thirds of the total).

In addition to income for service invoicing (and its configuration), another financing source that is often significant (as in the case of Greek firm EYDAP) is that of public subsidies. There could be direct subsidies agreed upon in advance with the service operator, like the case at hand, or subsidies offered via public financing of the works to expand the service or even to cover possible operative deficits of the licensee (this is the case of the water licensee Aguascalientes S.A. de C.V. in Mexico). Other forms of public subsidy involve a cost-free transfer of certain works (upon conclusion) that the state is developing when the services are transferred to the private sector (this is the example of Aguas del Aconquija S.A. in Tucumán, Argentina, in which case the contract was rescinded); direct government contributions in cases of public rendering of the service (like in Cochabamba, Bolivia, where besides taking over the debt of the private company

[7] In 1999, 39 percent of the shareholding capital of the firm was transferred to the private sector.

that rescinded on the contract in April 2000, the National Treasury makes regular contributions to the operator); rates subsidized by the state for the neediest sectors (originally in the case of both Tucumán and Limeira) and even more opaque forms, such as a government company providing the water to a private operator at prices that do not cover its production costs (Niterói).

Independently of the case of EYDAP, the remaining forms of subsidization are quite difficult to quantify. Apart from examples related to solidarity, equity, and proportionality – when subsidies are designed nor to negatively affect the economic-financial equation of the operator neither families with low incomes–, the mechanisms and criteria for determining and assigning subsidies are not usually characterised by their transparency. In cases of subsidies and or capital contributions related to public companies that render services, it is also impossible to easily determine whether such funds are assigned to satisfy social and political objectives or to cover the errors of deficient management.

As mentioned above, another basic component in terms of fund origins for service companies is owed to third party financing (domestic or international). In spite of the examples of Aguas Argentinas S.A., Thames Water Utilities Ltd. and EYDAP (in the last case, the company has not acquired debt), in the other experiences analysed here there is specific, heterogeneous information, what means that in only a few cases generalizations can be made on the significance (or possible significance) of operators falling into debt. In any case, these cases are not sufficient to reach solid conclusions related to the economic importance of third party financing for the companies´ financing.

For example, as can be concluded from Seppälä (2003), in Finland, there are contrasting situations like that of LV Lahti Water Ltd. (in 2001, third party financing represented just 5 percent of revenue accounts) compared to that of Lappavesi Ltd. & Lapua Severage Ltd. (in an attempt to avoid a hike in rates, this firm sought third party financing for an amount equivalent to that of its income from invoicing, close to one million Euros).

Similar considerations must be taken into account when analysing some of the experiences in Brazil. In the case of Niterói (Companhia Águas de Niterói), nearly half of the investments made over the past two years (investments that totalled approximately 45 million dollars, an amount equivalent to nearly a year and a half of invoicing) were financed by loans from the BNDES (Bank for State Development), 40 percent from direct contributions by shareholders, and the rest from profit reinvestment. Another case is that of Prolagos S.A.: through September 2002 (after a little more than three years of private management), all investments were financed with shareholder contributions. However, it is surprising to note that in this same year, the debt with third parties rose to nearly 1.7 million dollars (a little over 7 percent of the total income from invoicing). In any case, this business strategy (towards self-financing) seems to have been abandoned that same year, when the firm received first a 16 million dollar loan and obtained another loan from the Caixa Económica Federal (federal development bank) for another 22 million dollars. In relation to these amounts, it is important to note that the annual billing at the company is around 8 million dollars. Another case is that of Aguas de Limeira S.A.: in 2002, the percentage of interest payments in comparison with invoicing (around 5 percent) allows us to infer that the firm's debt will not grow significantly (Vargas, 2003; SNIS, several years).

Finally, it is useful to note the case of the license in the Bolivian city of Cochabamba. During the conflictive private provision times when services were rendered by Aguas del Tunari (1999-April 2000) as well as during the time in which the state provided the service (from April 2000 to date), the main financing method has been acquiring debt. In this sense, it is noteworthy that from 1999-2003, the total debt was almost 160 percent higher than the total invoicing (however, in 1999 the debt/total income relation was 4:1, while between 2000-2003, it averaged 2:1).[8]

In short, these examples allow us to conclude that whatever the type of management (public, private, or mixed) of drinking water services and environment sewer systems and whatever the overall quality of services rendered, financing is a crucial issue to achieve the goals of the United Nations. We mean financing in all its dimensions, from simple maintenance of the "situation status", to the attempts to extend universalised coverage. From the inferences that can be drawn from the heterogeneous (and thus attractive) experiences being analysed, it seems clear that the income from service invoicing is not sufficient to guarantee the economic-financial sustainability of companies, even in the countries with higher levels of development and/or less regressive distribution patterns. Recurring to third party financing (from direct state subsidies – even under private management – to seeking resources from private banking and/or multilateral credit organisms) tends to constitute a structural component in terms of the sources of funding for such companies.

Rate Structure and Criteria

To deal with the basic component of the economic-financial dimension, it is necessary to confront certain restrictions associated to a variety of issues, the most important of which we will address here. The first issue is of a socio-demographical nature, and it is related to the size and the characteristics of the populations covered by the services (in terms of the business costs involved, and considering both the real and potential scale of the markets: offering drinking water and sewer systems services in London, the city of Buenos Aires and suburban area, or Athens is quite different from doing so in Aguascalientes, Mexico; in the Finnish cities of Lahti or Kangasala, or in Nyeri and Tala Town, Kenya).[9] The second is a geographical issue related to the proximity of the cities or areas of service to the generation and appropriation centres for water sources (in this sense, rendering service in the Buenos Aires metropolitan area is – or should be – much

[8] Two comments should be made regarding these issues. In the first place, the drop in the debt/total income quotient before and after the rescission of the contract is owed to the fact that the Bolivian government renegotiated the debt incurred by Aguas del Tunari and achieved interest reductions (while taking responsibility for this amount). In second place, when analysing the debt composition of SEMAPA at the end of 2003, the result was that more than 90 percent was local debt (Crespo et al, 2004 and SEMAPA, 2004).

[9] With regard to these issues, it is important to note that at the beginning of this decade, the number of residents in the Buenos Aires metropolitan area was around 9.1 million people; in the city of London, 7.2 million and in Athens, 3.1 million: these populations are significantly higher than those in Aguascalientes (594,000 inhabitants) and in both the Finnish cities (115,000) and the cities of Kenya (142,000).

more economical, given the proximity to the Río de la Plata – than doing so in Aguascalientes, in Bolivian city Cochabamba or in Nyeri and Tala Town –place where, for different reasons, water constitutes a relatively scarce "good").

The combination of the aforementioned factors (to which we could add a few additional illustrative elements, such as the income distribution patterns that prevail in each country, the degree of expansion/coverage of both services, the type of services rendered, etc.) determines the range of costs in the services rendered and in the expansion and maintenance of the distribution networks and in the plants where water is sanitized. The result is that the vis-à-vis comparison of the existing rates in the different cases analysed is quite difficult and even futile. The following, then, is a brief analysis of certain issues that are considered important and which allow us to establish certain comparisons among the case studies: the principal existing criteria for rates, the current rate structure, and the adjustment mechanisms for the main rates and the evolution of rates for different types of service users. Other issues include the distinctive characteristics of the business performance and the identification of a presence (or lack thereof) of some type of consumer subsidies for low-income users (crossed and/or direct subsidies, social interest rates, etc.).

In terms of the available evidence, it is clear that the criterion for determining the respective rate charts is closely related to the importance of micro measurements in each of the case studies.[10] In this sense, if we sharpen the analysis, we can affirm that in the cities in which the use of meters is widespread (Aguascalientes, Limeira, Niterói and Prolagos), there are generally differential rates for different users. In principal, these differential rates are an attempt to offer equity and proportionality[11]; in contrast, in cities with a relatively low level of micro measurement, "mixed" rates predominate (this is the case of the metropolitan region of Buenos Aires, London, and Cochabamba).

Thus, for example, in the original license contract of Aguas de Aguascalientes S.A. de C.V., the rate system was based on marginal costs. In this agreement, differential rates were established based on socio-economic groups and levels of consumption (so that users with higher incomes and higher consumption levels would pay proportionally more than those with fewer resources and low levels of consumption).[12]

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[10] In terms of the issue of micro measurements, a short digression is needed. In many cases, the limited expansion of meter use has historically conspired against social consciousness of rationing water use. The scarce social value of water (and the idea that it is an infinite resource) is another serious challenge for the future, as says a high-ranking official at the World Bank, "the wars of the next century will be related to water" (Barlow, 1999). In this sense, the preservation and rational use of water will require us to invest in the expansion of micro measurements as one of the principal challenges to overcome.

[11] Although the nature of the basic information available does not allow us to reach significant analytical conclusions, the evidence offered by Seppälä (2003) allows us to argue that Finland has similar criteria to those of Mexico and Brazil in terms of establishing rate charts (in Finland, rates include operational costs, fixed costs, investment, and other charges for different services).

[12] However, Torregrosa et al (2003) note that bimonthly increases of 10 percent were applied to all consumption levels and rate levels (that is, the hikes were proportional). This is noteworthy, given that "although consumption is often linked to the socioeconomic level of families, the social groups with the highest incomes are those that consume the most. Thus increases in consumption are not proportionally consistent, since a family with high purchasing power will consume much less in relation to its income – even if it uses plenty of water – in comparison with a family with low income, which may have a single tap in their home. While the first family will have no problem paying their water bill, even if they pay the

At Limeira (Brazil), the system was based on four user categories that pay identical rates for each of the services (drinking water and sewers). The categories are based on consumption patterns (in which home owners equal approximately one third of industrialists). In all cases, the increases were progressive and depended on a certain scaling of water consumption.

In Niterói (Brazil), a few months after the license had entered into effect, four user categories were established (residential users, public sector, commerce and industry). Diverse scales were added based on consumption levels (five strata in the case of home owners, two for public entities and four in the other two categories). The flat rate corresponds to residential users who consume less than 15 m^3 per month, and all the other rates depend on this rate (according to progressive increments depending on the consumption level of drinking water).[13]

In the case of Prolagos (Brazil), similar criteria to that in Niterói were used (four user categories and consumption scaling – 12 strata for home owners and three for the remaining categories). The flat rate corresponds to domestic users who consume up to 10 m3 per month, and all other rates depend on this rate (according to progressive increments depending on the consumption level of drinking water).[14][15]

As mentioned above, the relatively low diffusion of consumption meters means that the criteria for drawing up rate charts at Aguas Argentinas S.A., Thames Water Utilities Ltd. and Bolivian SEMAPA are different than those already described. In the metropolitan area of Buenos Aires, two systems coexist. For those who do not have a meter (the great majority), the flat rate includes the "K" factor (any rate adjustments are applied to this factor). Coefficients for calculation include the residential area, total constructed surface of the property, dimensions of the lot and quality of the construction.

highest rate, the second may not even be able to pay the minimum rate, even if its consumption is low. Thus it is clear that even if the rate system were progressive, the differentiation of rates according to the socioeconomic level of the population would not be as proportional as it claims to be. This generates a population group that consumes a minimal amount but does not have the resources to pay." In relation to this last example, there is plenty of international experience on the correlation between income levels and water consumption at the residential level. Thus use of a greater number of home artifacts and facilities that consume water (the number of bathrooms, sprinkling systems, pools, etc.) by the middle and upper classes naturally leads to a higher consumption per capita than in needier homes (even more so when the micro-measurements do not exist). For more on the specific case, see Howe and Lineweaver (1967).

13 As can be seen in the evidence offered by Vargas (2003), the sewer service rates are in all cases identical to what should be paid for drinking water services. In general, rates for the public sector are multiplied (based on the flat rate – that which is paid by home owners who consume up to 15m3/month–) by 3; the correctional factor rises to 3-6 for stores and between 6-9 for industrialists.

14 As in the case of Niterói, in Prolagos, the rates for sewer system services are the same as those for drinking water. Rates for the public sector do not differ substantially from those of residents, while merchants pay three times more and industrialists four times more. In the cases in which the service is not measured (just 15 percent of the total, in the case of drinking water), the rates are based on estimated consumption based on the number of rooms in the house, the number of constructed square metres and the area where the residence is located (Vargas, 2003).

15 In any case, as we will see further on, in general this search for promoting equity and proportional water consumption (inherited from the scheme in place when the service was public) have been reduced or set aside, given the regressive impact that the behaviour of rates paid by different users on the different socioeconomic strata.

Users who have meters must pay 50 percent of the flat rate and a charge based on consumption (these rates are established for each service – drinking water and sewers – and they are similar). At the same time, two types of users are recognized (residential and non-residential) with identical criteria for determining rates.[16]

The analysis of the criteria that are used to establish rate charts in the city of London indicate that in the case of users with meters (close to 90 percent of non-domestic user have meters, but only 20 percent of home owners do), the fixed rates corresponding to sewer and drains are quite higher (more than double in 2003) than those for drinking water. This relationship is inverted – although with a lower level of intensity – in terms of the variable charges (again, in 2003, the charge per m^3 of drinking water consumed was almost 45 percent high than the sewer costs). In terms of consumers without meters, the rates for both services vary according to the seven zones in which the service area at Thames Water Utilities Ltd. is divided.

In Cochabamba, where approximately two-thirds of users have meters, two systems also coexist (with meters and without), with rates that are based on two large groups: residential[17] and special[18] users. The users who do not have a meter pay a flat rate differentiated by category according to their average consumption (invoicing is based on the average consumption of the remaining users of the same category). In the case of users with meters, the flat rate is based on minimum consumption (12 m^3 per month), which varies according to the different categories, as well as a variable rate based on additional consumption. These rates are set exclusively for the drinking water service, since the charge for the sewer system totals 40 percent of the amount invoiced for water in the residential categories and 65 percent for special consumers.

The identification of the main criteria used to determine rate charts in the different cases analysed here is enriched if we incorporate the main characteristics of the respective rate structures. In this sense, the evidence presented on Table Nº 4 suggest that,

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16 In the Argentine province of Tucumán, the regulatory framework that was in effect from mid-1995 through mid-1997 – the point when both the firm and the provincial government decided to rescind on the contract (The firm claimed that it was "the fault of the province" while the government accused the firm of "not fulfilling the contract"), was characterized by the lack of regulatory mechanisms –either direct or indirect– on the profit margin of the concessionary (even though the provincial law of public works established a 10 percent limit on profits). On the other hand, within the privatization scheme, property owners were required to pay services when they had been exempt from doing so beforehand. The sector's regulatory framework established that rates "should reflect the economic cost of rendering the services. This includes the profit margin and the costs that arise from the approved expansion plans." Based on a definition of three user categories (general, commercial and industrial, and special), the rate was assigned the "K" factor, which included zone coefficients, constructed number of square meters, total surface meters, and the age of the residence. Consumers with meters (who represented just 10 percent of the total) were required to pay a minimum fixed amount of consumption (15m3 per month) and a variable charge that depended on the number of cubic metres consumed (there was no free rate established for one category – pools, gardens, and stadiums). For more on these issues, see Crenzel (2003).

17 At the same time, this universe of consumers is sub-divided into four categories (R1, R2, R3 and R4) according to the criteria of lot surface, number of floors, quantity of water points, and the status and quality of the building.

18 Special categories are classified as commercial, special commercial, public, industrial and preferential; this was based on the type of water use (human consumption, raw material for production, etc.) on one hand, and the nature of the property (private business, public, social purposes, etc.) on the other.

independently of the different situations in each country, in most cases, there is a progressive rate structure. This is reasonable (and predictable) given that in general, the deficits in terms of accessing drinking water and the sewer system and the level of difficulty that people have to pay their bills are usually focused primarily on users with the fewest resources.

However, there are two significant issues that must also be taken into account. The first is that obviously the aforementioned progressive nature varies in each case. The second, which is even more relevant, is that this progressiveness is revised when we consider the evolution of rates paid by different users and the incidence of this behaviour standard on the distribution of income (as we will see, when the rate dynamic is compared vis-à-vis with salaries or another indicator of the acquisitive power of the different socio-economic strata, it becomes clear that almost all of the cases studied are relatively more detrimental to consumers with the lowest income, with the resulting regressive implications in distributive terms.)

Table Nº 4. Principal characteristics of the rate structure for drinking water and sewer system services for a selected group of cities/areas

City/Region – Company	Principal characteristics of the rate structure
Metropolitan area of Bs. As. (Argentina) – Aguas Argentinas S.A.	In its beginning, the "K" factor was used to take into account the area, age of the building, constructed square meters and total square meters of the property, plus a fixed charge for infrastructure costs. When this infrastructure charge was eliminated at the end of 1997, other fixed charges were incorporated like the SUMA (universal service and environment), CIS (charge for service incorporation), CMC (maintenance charge for connections) and CIA (charge for additional income). In addition, users must also pay the VAT (21 percent) and funds to finance the regulating entity (2.7% of invoicing).
Tucumán (Argentina) – Aguas del Aconquija S.A.	During the period when the service was private, the rate structure was similar to that in effect in the metropolitan region of Buenos Aires.
Athens (Greece) – EYDAP	The rate structure acknowledges four large categories: residential (with five strata of average consumption), industrial (with two segments, either less or more than 1,000 m^3/month), and the public and municipal sectors. Before the firm opened itself to private capital (in 1999), there was a high "penalty" for residential users who exceeded 27 m^3/month. These characteristics have been maintained throughout the past few years, but the gap between the different rates with respect to municipal buildings has shrunk substantially.

City/Region – Company	Principal characteristics of the rate structure
Aguascalientes (Mexico) – Concesionaria de Aguas de Aguascalientes S.A. de C.V.	Currently the rate structure and its application involve the following: an increase in the minimal charge volume from 10 to 20 m^3, a monthly adjustment for inflation, monthly invoicing, and extension of the minimal consumption to rural users. Schools and hospitals are now charged if they exceed a certain minimal consumption level.
Cochabamba (Bolivia) – SEMAPA	The categories are defined for charging rates under a system of meters and the following is a description of the structure. Residential categories (R1, R2, R3, R4) are differentiated according to lot surface, number of floors, number of water points, and the state and quality of the building. Special categories are classified as commercial, special commercial, public, industrial and preferential, according to the type of water use (human consumption, raw material used to transform products) and according to the property (business, public nature, or social purposes).
City/Region – Company	**Principal characteristics of the rate structure**
Finland* – LV Lahti Water Ltd., Kangasala Municipality Water and Sewerage Utility	No information available.
Limeira (Brazil) – Aguas de Limeira S.A.	Four categories were established: industrial (rate 147 percent higher than for residential users), commercial (129 percent higher), public (23 percent higher) and residential. In all cases, the rate level is progressive according to consumption levels.
Niterói (Brazil) – Companhia Águas de Niterói	In general, this is a progressive rate structure in terms of user categories and consumption levels.
Prolagos (Brazil) – Prolagos S.A.	In general, this is a progressive rate structure in terms of user categories and consumption levels.
London (England) – Thames Water Utilities Ltd.	In the case of the meter system, this has a progressive rate structure in terms of consumption levels, while in the non-meter system, rates vary according to the area: seven service areas have been defined where water services are rendered.

* Includes the following cities: Lahti, Kangasala, Lapua, Nurmo, Kuortane and Kauhava.

Now that the rate criteria utilized in the different cases under analysis has been identified along with the respective rate structure, it is important to present the analytical perspectives proposed here. Towards this end, Table Nº 5 presents the mechanisms for

rate updates that are used in the principal cities or regions analysed, in addition to the recent evolution of the rates paid by different types of consumers.

When considering the information on the reference chart, it is clear that the regulatory frameworks of the different cases studied show an adjustment mechanism for the rates. Some of the most important include ordinary and extraordinary revisions of the rate charts, adjustments for modification in the costs involved in rendering the services and/or according to the evolution of the domestic inflation rate (or, as in the case of the metropolitan region of Buenos Aires, based on the fluctuations of US prices)[19] and/or the purpose of transferring part of the productive or microeconomic gains – more appropriately, of the monopoly profits– to users and consumers from the companies rendering services (as in the case of Great Britain, where rate regulation is *price cap* type). As could be expected and in spite of a few exceptions, the existence (and, in most cases, the coexistence) of such different indexing modalities implied increases – with different levels of significance and variables according to each city or region– in the final rates paid by different users of drinking water and sewer system services.[20]

[19] The example of Aguas Argentinas S.A. is particularly interesting due to the fact that almost simultaneously with the license (May 1993) an unusual process began. This was characterized by frequent contract revision that continually altered the "spirit" and the "letter" of the original contract, especially in terms of rate regulation. In mid-1994, as the result of a request for an extraordinary rate revision, the government gave the go ahead for a rate increase of more than 13 percent. Towards the end of 1997, when there was sufficient cause for rescinding on the license contract (given the way in which the firm was clearly not complying with the contract, as confirmed by the regulating entity), the Menem administration opted to renegotiate the conditions for the firm's operations. These terms were clearly in the company's best interest (some of the principal modification included a rate increase and the cancellation or postponement of a series of investment that were originally included in the contract). At the same time, the possibility of completing an annual extraordinary rate revision was added. In May 1998, the firm obtained another rate increase of around 5 percent. Following these license contract reviews, there were new negotiations that followed a similar logic as the earlier ones: among other aspects, there were new rate increases, the introduction of peculiar price adjustment clauses (the rates, set in pesos, were adjusted yearly according to the US inflation rate) and the modification of certain contractual obligations originally agreed to by the company. At the beginning of 2001, an Act-Agreement was signed between the federal government and the licensee. This agreement approved a new rate increase and the incorporation of new additional bimonthly charges. On this particular case, see Azpiazu and Forcinito (2003 and 2004) and Azpiazu and Schorr (2003a).

[20] Due to the intensity of the increases, it is important to return to the case of the water and sewer system supplier in the metropolitan area of Buenos Aires (Azpiazu and Forcinito, 2004). In favour of the multiple contract revisions, the average residential rate charged by Aguas Argentinas S.A. rose by approximately 88 percent between May 1993 and January 2002 (in the same period, consumer prices registered a 7 percent hike). This is noteworthy because the regulatory framework clearly established that rates could not increase for a period of ten years (in fact, they should have decreased as a result of the ordinary revisions outlined in the license contract).

Table Nº 5. Mechanisms for rate adjustment and evolution of the water and sewer rates for a selected group of cities/areas

City/Region – Company	Mechanisms for rate adjustments	Rate evolution
Metropolitan area of Bs. As. (Argentina) – Aguas Argentinas S.A.	Originally, no periodic adjustments were planned (an extraordinary rate revision was only planned if increases exceeded 7 percent). After a series of additional contract negotiations, diverse fixed charged were added, and rates were indexed based on the US price index with 0.5 percent reduction of the cost increase threshold. In short, this is a "hybrid" mechanism that combines price cap and cost plus.	The average residential rate rose 88 percent between May 1993 and January 2002, compared to a 7 percent rise in consumer prices. Although there is no information on the evolution of average rates for the non-residential category, it can be inferred that its evolution is not very different from that of residential rates.
Tucumán (Argentina) – Aguas del Aconquija S.A.	The original contract established a regular rate revision fortnightly (in the first ten years, this could only decrease) with extraordinary revisions for eventual increases in costs, changes in the water or sewer quality norms, investment goals, or to establish a more efficient rate regimen. In practice (and with a few additional contract renegotiations), in the first year of the license, there was a 68 percent increase, and a 10 percent increase in the second year.	There were substantial increases in the real service rates based on renegotiations with the government. These did not take into account the criteria established in the original contract (taking into account the magnitude of increases, nearly 90 percent of the users – including the headquarters of the provincial government – decided not to pay their bill in protest).

City/Region – Company	Mechanisms for rate adjustments	Rate evolution
Athens (Greece) – EYDAP	In the 2000 rate revision (valid for five years), rates were raised at an adjustment based on yearly inflation was established (in any case, in 2001, the rates were not modified).	Between 1996 and July 2000 (that is, before and after the partial privatization), rates rose for all types of service (residential, industrial, public and municipal), although in differing proportions: residents with low consumption thus paid 4 percent more; residents with high consumption, 5 percent; industrialists and the public sector, 5 percent as well, and municipal buildings, 35 percent.
Aguascalientes (Mexico) – Concesionaria de Aguas de Aguascalientes S.A. de C.V.	In the original contract, it was established that the rates would be modified at the request of the licensee (which was empowered to propose rate modifications twice a year). After the contract modification in 1999, the rate revision is done every four years, but in addition, the rate regimen has an automatic indexation (monthly) based on price variations in the principal costs.	There were rate increases before the private firm began offering the service; from then until the contract revision in 1996, there were new important rate increases. After this, in the framework of new indexation mechanisms, there were additional rate hikes.
Cochabamba (Bolivia) – SEMAPA	According to the original SEMAPA license contract, the firm has the right to request an extraordinary rate revision fortnightly when "unforeseen" increases in the costs of the firm arise.	Since the "water war" conflict (April 2000), rates have been frozen.
Finland* – LV Lahti Water Ltd. and Kangasala Municipality Water and Sewerage Utility	Each town defines rate variations.	No information available.

Continued

Continuation

City/Region – Company	Mechanism for rate adjustment	Rate evolution
Limeira (Brazil) – Aguas de Limeira S.A.	From the beginning of the license until the renegotiation in January 2001, rates were frozen. Later, an annual adjustment based on the variation in the index of the Unidade Fiscal do Município de Limeira (UFML) was made. On the other hand, if technical, economic, financial or other reasons affect operational costs, investment financing or the economic-financial balance of the license, the rate can be either raised or decreased.	From the beginning of the license until the renegotiation in January 2001, rates were frozen. After a series of legal and parliamentary disputes, a scaled rate readjustment of 63 percent was achieved in comparison with an inflationary increase – during the period of frozen rates – of 40 percent (in any case, in comparison with other suppliers in Brazil, the average water and sewer rate is below local standards).
Niterói (Brazil) – Companhia Águas de Niterói	Periodic rate adjustments are made based on the price variations in a combination of representative activity costs.	In November 2001, after 20 months without adjustments, rates rose 18 percent (inflation for the same period was 10 percent). In November of the same year, the annual adjustment was 18 percent (compared to the 7 percent inflation rate for the period). The intensity of the rate adjustments had been identical for different user and service types and categories.
Prolagos (Brazil) – Prolagos S.A.	In spite of the adjustments that arose from the contract revision in February 2002, rate adjustment is based on the annual recognition of the increases of the values of a series of representative categories within service costs.	Until January 2002, rates rose 40 percent (a rise slightly lower than the rise of consumer prices). In the contract revision of February 2002, additional increases were included: 7 percent increases beginning in January of that year, 6 percent in January 2003 and 7 percent in January 2004.
London (England) – Thames Water Utilities Ltd.	There is a periodic fortnight revision completed by the economic regulator that	In the 1999 revision, the regulating entity demanded a rate reduction for the period of

City/Region – Company	Mechanism for rate adjustment	Rate evolution
	establishes rate levels as well as eventual changes in the rate structure. This is a scheme known as *price cap*.	1999-2004 to compensate for excessive profits during the previous period. These were associated to an increase of around 95 percent in the average rates during 1989-1999.

* Includes the following cities: Lahti, Kangasala, Lapua, Nurmo, Kuortane and Kauhava.

The form in which the regulatory frameworks and the resulting rate behaviour impacted on the economic performance of the different firms is a key arising issue. Although it is not possible to carry out a rigorous comparison of the evolution of the different business costs (operations, management, amortisation, financial costs, capital costs, etc.), or of the relation of these costs with the companies' income and costs structure,[21] it is useful to introduce a few conclusions that arise when analysing the internalised companies' profit margins. From this perspective, two situations can be identified:

- That of companies which registered positive profit percentages: this is the case of Aguas Argentinas S.A. (between 1993 and 2001, the average profit percentage in terms of sales was 13-20 percent with respect to the firm's net patrimony)[22]; at

[21] In spite of these limitations, it is important to offer some empirical evidence on these issues. The information available indicates that in the case of Aguas Argentinas S.A., there is a gradual, persistent reduction in operational costs that is accompanied by an increase in the costs of commercialisation and administration (which grew from 30 percent of the total costs at the beginning of the concession to nearly 50 percent in 2001; in the same period, the operational costs went from approximately 73 percent of the revenue accounts to less than 40 percent). In the case of Cochabamba, between 2001 and 2003 the expenses of the licensee exceeded, on average, the total income by nearly 12 percent and the revenue accounts by 18 percent. In the Finnish cities in this study, operational costs represented between 40 and 50 percent of the revenue accounts of the companies. When analysing the operational costs/sales income for the service firms in Limeira and Niterói, this was 40 percent and over 57 percent respectively (in Prolagos, the operational costs of the firm were higher than the amount invoiced). In the case of Thames Water Utilities Ltd., the data corresponding to the six-year period from 1998-2003 indicate that the operational costs represented, on average, 40 percent of the firm's total income. See Azpiazu y Forcinito (2003), Castro (2003), Crespo et al (2004), Seppälä (2003), Vargas (2003) and OFWAT (2004a and 2004b).

[22] Without a doubt, these are extraordinary profit levels at both the national and international level. In this sense, it is useful to note that during the time of the period in question, the largest two hundred companies in Argentina registered (on average) a profit percentage of approximately 3 percent in terms of annual sales, and that the levels of profitability (percentage of invoicing and with respect to net patrimony) at the company that offers water and sewer services in the metropolitan region of Buenos Aires has been far above the levels of the private firms operating in the water sector in the principal countries of the world (for example, in the United States, the profit percentages on net patrimony in the 1990s fluctuated between 6 and 12 percent; in the United Kingdom, available evidence indicate that the reasonable rate for the sector

Greek firm EYDAP (in the four year period 1998-2001, net profits represented around 17 percent of the firm's total income)[23]; at Finnish firms LV Lahti Water Ltd. and Kangasala Municipality Water and Sewerage Utility[24]; at Brazilian Companhia Águas de Niterói (in 2002, the profit margin grew to 9 percent of total assets and to almost 17 percent of liquid assets); at Thames Water Utilities Ltd., the average return rate on capital between 1998 and 2003 was 8 percent[25]; and

- That of firms which obtained negative profits margins: this is the case of Argentine company Aguas del Aconquija S.A. (until the contract was rescinded in 1997, the firm operated systematically with accounting deficits); at Bolivian SEMAPA (between 1994 and 2003, it always registered negative results); and, at Brazilian Aguas de Limeira S.A. and Prolagos S.A., in 2002, the first reported losses totalling 1 percent of its total assets, a percentage that rises to more than 33 percent in the case of the latter.

Before wrapping up this section and as a complement to the considerations above, it is useful to incorporate some brief comments related to an extremely relevant question. Considering, on the one hand, that drinking water is a fundamental human right and, on the other, that deficits in the sector (in terms of network expansion, the quality of services rendered etc.) tend to affect users with the lowest purchasing power more than others, the issue, then, is whether there is a subsidy mechanism in any of the cases analysed in which low income consumers can access drinking water and environmental sewer systems at a "reasonable" price.

As proposed by Solanes (2003), not all public utilities users have the resources to pay for the costs of these services (including the capital costs). Thus, for reasons of public interests (such as preventing illnesses transmitted by water, like cholera) as well as human interests and equity, countries are usually interested in facilitating access to all public utilities, but especially to water and sewer systems. In the case of consumers with low income, this access requires that the funds needed to pay for the services be provided by other individuals and not the direct beneficiaries (like, for example, other users, the

is between 6 and 7 percent, while in France an acceptable return rate is around 6 percent). In this respect, see Azpiazu and Forcinito (2003 and 2004) and Philips (1993).

[23] As noted by Kallis and Coccossis (2003), the strong performance of the company offering services in the city of Athens is not related so much to a rise in productivity, but to a considerable reduction in the amortisation costs that resulted when an important part of the EYDAP fixed assets were transferred to the Greek government (between 1998 and 2001, the depreciation costs diminished by nearly 40 percent) and with state subsidies to the company. The information available allows us to affirm that the other side to the relatively successful performance of the firm was a significant distribution of dividends among private shareholders (keep in mind that since 1999, 39 percent of the social capital at the company is in private hands, as mentioned earlier).

[24] According to Seppälä (2003), both firms are "economically healthy and profitable" and their recent performance has been better than expected (especially in the case of LV Lahti Water Ltd.).

[25] According to information from the regulating entity (the OFWAT), this profit margin is similar to the average margin of the British "water industry" (for more information, visit the following website: http://www.ofwat.gov.uk).

government, or the company itself). In this respect, there are three basic strategies: the user of traditional crossed subsidies that can offer access by creating an internal redistribution among the users of a given sector; direct subsidies provided by the government, and the implementation of a social interest or solidarity rate. Ultimately, the goal of these mechanisms is to increase the level of coverage of users with the lowest income levels and/or those who cannot access the services at all (potential users).[26]

Given the central nature (socio-economic and even political) of the issue at hand, and in order to answer the proposed issue, Table Nº 6 attempts to present the modalities of existing crossed subsidies and the social interest tariff in the licenses being analysed. In addition, due to its close relationship to the issue at hand, information is also included on what happens in the different cities/areas when users do not pay their water bills.

Table Nº 6. Presence/absence of crossed subsidies and a social interest rate, and modalities for suspending water and sewer services due to lack of payment in a selected group of cities/areas

City/Region – Company	Are there crossed subsidies?	Is there a social interest rate?	Will the company suspend service for lack of payment?
Metropolitan area Bs. As. (Argentina) – Aguas Argentinas S.A.	Yes, but these are increasingly opaque given the proliferation of fixed charges (specifically, as of 1997).	A social rate was introduced in 2001 for sectors with the fewest resources (the amount equals about 1 percent of invoicing). The cost of this rate is the responsibility of the company.	Yes, if the water bill is not paid for three consecutive two-month periods.
Tucumán (Argentina) – Aguas del Aconquija S.A.	During the private administration of services, there were crossed subsidies, given that zone coefficients (based on the type of construction and its age, etc.) suggested the presence of crossed subsidies from the (supposed) sectors with higher income towards	During the private administration of service, there was no social interest rate.	This was originally planned, but later the provincial legislature prohibited the suspension of services as a result of lack of payment.

[26] For a more detailed examination of these issues, see Lee and Jouravlev (1992) and Solanes (2003).

City/Region – Company	Are there crossed subsidies?	Is there a social interest rate?	Will the company suspend service for lack of payment?
	those with lower income.		
City/Region – Company	**Are there crossed subsidies?**	**Is there a social interest rate?**	**Will the company suspend service for lack of payment?**
Athens (Greece) – EYDAP	In principle, there would be crossed subsidies from residential users with medium-high consumption towards residential users with low consumptions, towards municipal rates, and to a lesser extent, toward industry and the public sector.	The license contract acknowledges the figure of the "protected consumer" (individuals from the sectors with fewest resources that could deserve special treatment).	The suspension of services is allowed in response to lack of payment.
Aguascalientes (Mexico) – Concesionaria de Aguas de Aguascalientes S.A. de C.V.	Yes, although the available evidence indicates that they are insufficient.	Based on the contract revision in 1996, the "social support fund" was acknowledged. This figure was aimed at subsidizing the consumption of the neediest members of the population (to access this, users had to pay 50 percent – or even less – of the bill if their consumption did not exceed 20 m^3/month).	The suspension of services is allowed in response to lack of payment.
Cochabamba (Bolivia) – SEMAPA	There is a sort of crossed subsidy of non-domestic users (especially those in the special commercial	A social rate was not introduced for the sectors with fewest resources, but there is a base rate per	Yes, if the user does not pay for two consecutive months.

City/Region – Company	Are there crossed subsidies?	Is there a social interest rate?	Will the company suspend service for lack of payment?
	category) towards residential users (specifically, those in the lowest categories).	category for users without meters.	
Finland* – LV Lahti Water Ltd. and Kangasala Municipality Water and Sewerage Utility	There is a sort of crossed subsidy that varies according to user types and categories and from region to region.	There is no social interest rate.	The suspension of services is allowed in response to lack of payment, although the evidence shows that disconnections rarely are effected.
Limeira (Brazil) – Aguas de Limeira S.A.	Yes, from the industrialist and commercial sectors towards homeowners (basically geared towards those with lower consumption levels).	Residential users who consume under 15m^3 per month pay 50 percent of the rate. Those who consume between 16-30m^3/month have a 25 percent discount. These discounts comprise the so-called popular residential rate for needy homes (and cannot be extended for more than twelve months). Municipal properties used for activities such as water connections for public cleaning, water trucks, etc. are exempt from paying the water and sewer system rates.	Service suspension is outlined in the service Rules in response to non-payment and after notifying the user, who must then confront the costs of suspending and later re-establishing service.
Niterói (Brazil) – Companhia Águas de Niterói	Yes, public users and especially merchants and industrialists pay rates must higher than	Residential users with low income who consume less than 15 m^3/month receive a 40 percent discount on their bills.	The suspension of services is allowed in response to lack of payment.

City/Region – Company	Are there crossed subsidies?	Is there a social interest rate?	Will the company suspend service for lack of payment?
	those paid by homeowners.		
Prolagos (Brazil) – Prolagos S.A.	Yes, in both the differences and the scaling among user categories (from merchants and industrialists towards residential users with low consumption), as in the case of users without micro-measurements, when it is clear that those who live in better areas and residence subsidize those who live in smaller and/or needier homes.	As decided by the company, the rate corresponding to the band of users consuming less than $10m^3$/month constitutes a social rate.	The suspension of services is allowed in response to lack of payment, after applying fines and penalties to the user for non-payment.
London (England) – Thames Water Utilities Ltd.	In the information offered by the OFWAT, it is clear that in the case of users with micro-measurements, rates increase progressively according to the level of consumption. For users without micro measurements, rates vary according to the service area where the building is located.	There is no social rate system, but there is a reduced rate that is applied only to users with specific needs who have a meter.	Since the privatization of the service, there have been no disconnections for non-payment; however, in 1999, a law was passed prohibiting service disconnection for residential users who could not pay their rates. Along these lines, it is

City/Region – Company	Are there crossed subsidies?	Is there a social interest rate?	Will the company suspend service for lack of payment?
			noteworthy that 20 percent of British and Welsh families are currently in debt to the water companies.

* Includes the following cities: Lahti, Kangasala, Lapua, Nurmo, Kuortane and Kauhava.

The facts presented on Table Nº 6 allow us to reason that in all of the cases under analysis, there is (or there has been) some mechanism designed to assist users with low income to access water by paying a "reasonable" price (whether this be achieved by crossed subsidies and/or a social interest rate).[27] In any case the impact (which is usually regressive) of the recent behaviour of rates paid by different customers presents certain issues in terms of the efficiency of such subsidies; this is augmented in some cases, like that of the Buenos Aires metropolitan region and that of Cochabamba, by the relatively low degree of coverage of both the drinking water and sewer system services (in other words, the universe of potential beneficiaries is reduced).

With respect to the previous issue, the information offered on the reference table allows us to conclude that, with the exception of England,[28] the regulatory framework in all cases permit the companies to suspend service for users who incur in "non-payment". This is critical given that in the majority of the countries included in this study, unequal income distribution patterns prevail. Thus there is a higher risk that consumers with the fewest resources will be able to access drinking water and/or sewer systems (for such users, these services are relatively more costly than for the social strata with medium-high incomes). Thus these individuals have trouble paying their bill (and fall into the late payment category, or the "unable to pay" category).

[27] At most of the licensee firms, there are crossed subsidies and/or some sort of solidarity rate; direct subsidies have acquired particular importance in Athens and in Aguascalientes.

[28] Under the Labour Party, the British Parliament prohibited disconnections for non-payment, arguing social reasons and public health.

Capital Formation and Financing

In the previous sections, an attempt has been made to determine the origin of funds generated by the different water and sewer service providers included in the research, in addition to distinctive aspects of the firms' recent economic performance and the principal elements that explain these performances. This section, then, seeks to complement – and, when possible, to enrich – the earlier analyses, by dealing with two highly relevant issues (especially when considering that water constitutes a *fundamental human right* and that "provision deficits" mainly characterize and affect underdeveloped countries). These two issues are those problems related to the investment made by the company (its magnitude and intensity, its profile, etc.) and to the different privileged mechanisms available for firms to finance capital formation.

An initial analytical perspective is that which arises when comparing the investments that the companies agreed to[29] in comparison to those actually made. The evidence offered on Table Nº 7 allow us to conclude that for different reasons, in almost all cases under analysis, the established investment goals (which include issues as different as the extension and/or rehabilitation of the water network, improvements to treat effluents, the increase of degrees of service coverage, the installation of new factories for making water potable, etc.) were to a greater or lesser extent not complied with (obviously in different proportions – although this is difficult to quantify, given the nature of the data available – which varies from case to case).

In this sense, it is useful to bring up the examples of Aguas Argentinas S.A. (according to the regulatory body, the contractual non-compliance in terms of capital formation involves a deficit with respect to the original agreement of providing 800,000 inhabitants with drinking water; of providing more than 1 million inhabitants with sewer system services, and of supplying more than 6 million people with primary water treatment) (ETOSS, 2003); of Greek firm EYDAP (since the partial privatisation of the firm, many of the investment agreements have not been met); of the license of Aguas de Aguascalientes S.A. de C.V. (in spite of the fact that the original contract was renegotiated in 1996, few of the investment goals have been attained, and there is still an important gap in terms of the physical efficiency of the network), and the events in Cochabamba (amidst a conflictive rendering of services handled by private firm Aguas del Tunari, none of the agreed investments were made – now the national company that inherited the license, SEMAPA, must confront a series of deficiencies in terms of the networks and the connections).[30]

[29] In the case of the private companies, this is about the commitments to make investments that are included in the respective concessionary contracts and/or in certain revisions or renegotiations of the contracts.

[30] In this respect, see Azpiazu and Forcinito (2003 and 2004), Kallis and Coccossis (2003), Crespo et al (2004) and Torregrosa et al (2003).

Table Nº 7. Investment obligations and characteristics of investments in water and sewer systems in a selected group of cities/areas

City/Region – Company	Investment Obligations	Evolution and characteristics of the investments made and the level of service coverage
Metropolitan area of Bs. As. (Argentina) – Aguas Argentinas S.A.	The licensee originally agreed to invest 3.95 billion dollars during the 30 years of the license. This period was segmented into six five-year periods and at the end of each of these, the investments for the following five year period were to be planned.	According to information from the company, between 1993 and 1999, investments in infrastructure expansion reached 678 million pesos/dollars; investments in rehabilitation and renovation totalled 211 million pesos/dollars, plus an additional 158 million pesos/dollars were spent on other areas. Again, according to the company, by 2002, nearly 3 million new users had been incorporated, but the regulating entity (ETOSS) deemed that the level of non-compliance with the investments actually made (in comparison with those outlined in the contract) reached 42 percent during the first five years of the administration and 33 percent between 1999 and 2002. This meant that although the firm committed itself to attaining an 88 percent service coverage for water, it only achieved 79 percent; the percentages in the case of the sewer system were 74 percent versus 63 percent (respectively). As a result of the firm's non-compliance (and not just in terms of investments), the ETOSS fined the company (according to the entity, in July 2003, the fines totalled 40 million pesos, but the company had only paid 42 percent of these).

City/Region – Company	Investment Obligations	Evolution and characteristics of the investments made and the level of service coverage
Tucumán (Argentina) – Aguas del Aconquija S.A.	The firm originally agreed to extend the connection network and increase existing coverage in terms of access to drinking water and sewer systems until achieving universal coverage after eight and 13 years (respectively).	As a result of the social conflict generated by the license, the expansion goals were not met and the advances in terms of increasing coverage were practically null (keep in mind that at the beginning of the 1990s, the coverage of drinking water via public networks had reached around 80 percent of the population of the province, while coverage in terms of sewer systems – which were mainly concentrated in the capital of the province – was lower than 35 percent).
Athens (Greece) – EYDAP	From 2000-2008, EYDAP agreed to invest close to 1.2 billion Euros.	During 2000, the investments made were 20 million Euros below those agreed to. The information available indicates that in the following years, such discrepancies continued (the firm executives claim that this is owed to the fact that the Greek government has not complied with its contract obligations, which involve the state subsidising up to 60 percent of investments). In terms of increasing coverage, it is worth noting that in the period before the partial privatization, service expanded significantly (reaching almost 100 percent coverage for water and sewer systems).

City/Region – Company	Investment Obligations	Evolution and characteristics of the investments made and the level of service coverage
Aguascalientes (Mexico) – Concesionaria de Aguas de Aguascalientes S.A. de C.V.	According to the original contract, the licensee would invest in maintenance and infrastructure for efficient rendering of services. The work of rehabilitation and extension would be covered with the corresponding rate fraction, in addition to federal, state, and municipal contributions. Later, in 1996, the firm was quite lax with regards to these obligations.	The investments made from 1993-1999 reached 110 million pesos (nearly 12 million dollars). The company's greatest achievement was reducing residential leaks and increasing the number of home meters, and thus the objectives mentioned as essential – the physical efficiency solution – have not been met to date (it is useful to note that the public sector contributes an important part of the resources destined to financing system maintenance and development). Before the privatization, Aguascalientes had a high level of coverage (in 1990, 96 percent of homes had piped water, a rate that rose to 98 percent in 2000. The rate of homes with sewer drains was 93 percent in 1990 but rose to 97 percent in 2000).

City/Region – Company	Investment Obligations	Evolution and characteristics of the investments made and the level of service coverage
Cochabamba (Bolivia) – SEMAPA	During the license of Aguas del Tunari (1999-2000), initial investment obligations totalled 214 million dollars (the investments planned included an extension of the drinking water network and the construction of a new water treatment plant, the extension of another network, the creation of crude dyke water plus the installation of pipelines from Misicuni to the valley of Cochabamba, more drinking water and irrigation, and the generation of electric energy). In the case of SEMAPA, there are no exact data on investment obligations, although it is useful to note that the firm applied for loans from different organisms in order to complete several investment projects.	Due to problems between locals in Cochabamba and Aguas del Tunari, none of the investments were made. There are currently many problems in terms of both networks and connections, which SEMAPA plans to resolve by taking out local and international loans. The information available indicates that water coverage is at around 52 percent for all of Cochabamba.
Finland* – LV Lahti Water Ltd. and Kangasala Municipality Water and Sewerage Utility	Towns must define investment plans for the companies.	Investments made were geared to guaranteeing sustainable service in the middle/long term. Coverage levels are high (drinking water: LV Lahti Water Ltd., 98% and Kangasala Municipality Water and Sewerage Utility, 87%; sewers: LV Lahti Water Ltd., 97% and Kangasala Municipality Water and Sewerage Utility, 83%).

City/Region – Company	Investment Obligations	Evolution and characteristics of the investments made and the level of service coverage
Limeira (Brazil) – Aguas de Limeira S.A.	Originally, the licensee agreed to make investments totalling 98 million dollars (35 percent of these during the first five years of the license).	The original obligations were not fully met by the company when rates were not adjusted. In 2002, investments totalled 9 million Reales (close to 3 million dollars); nearly 60 percent went to the sewer system, a little over 20 percent to providing drinking water, and the remaining 20 percent to other ends. In terms of coverage, the goals established in the license contract (95 percent for drinking water and 80 percent for the effluents) were fully satisfied (what is more, these goals had already been met when the contract was signed).

Continuation

City/Region – Company	Investment Obligations	Evolution and characteristics of the investments made and the level of service coverage
Niterói (Brazil) – Companhia Águas de Niterói	During the 30 year license period, investments of more than 100 million dollars were planned.	Towards the end of 2001, 90 percent of investment had gone to expanding the drinking water network and just 10 percent to the sewer system. In 2002, 91 percent of the investment went to the sewer system and to treating effluents. In terms of the degree of service coverage, the goals in terms of drinking water (90 percent for the area covered in the first three years) were fully met. In terms of sewers, the goal of reaching 60 percent coverage within three years had been achieved in 2001.
Prolagos (Brazil) – Prolagos S.A.	The original investment totalled 152 million Reales over 25 years (90 percent of this total was to be concentrated in the first five-year period).	In the first thirty months of operation, the investment reached 60 million Reales, but later dropped significantly. However, in 2002, there was a significant recovery. The firm's commitment (which it kept) was to achieve 80 percent coverage in water provision and 30 percent in terms of sewer systems by the third year of the license (these percentages must reach 83 percent and 40 percent respectively by the eighth year of the license).

City/Region – Company	Investment Obligations	Evolution and characteristics of the investments made and the level of service coverage
London (England) – Thames Water Utilities Ltd.	The company plans to invest 3.5 billion Sterling Pounds between 2005 and 2010 in infrastructure. The information available indicates that in terms of investments, there are two important "bottlenecks": (a) the main network is nearly a century old and (b) almost no advance has been made in terms of recovering losses since privatization. In addition, there is a relatively low level of micromeasurements in the area of residential consumers.	From 1998 to 2003, accumulated capital investment reached 2.4 million Sterling Pounds (44 percent of the firm's income). Of this total, 56 percent corresponded to water and 44 percent to sewers. In terms of the coverage issue, this is not a relevant problem in London, given the high existing levels of coverage.

* Includes the following cities: Lahti, Kangasala, Lapua, Nurmo, Kuortane and Kauhava.
Source: Author.

The aforementioned example differ greatly from what occurred at Aguas de Limeira S.A., at the Companhia Águas de Niterói and at Prolagos S.A. (in these three cases, it is possible to say that the goals set in the respective contracts for water and sewer services during the first years of the license were fully met – however, it is necessary to note that for sewer drains, coverage is still relatively low).

In this sense, another characteristic that is common to most of the international cases of this analysis is the different level of investment maturity and the resulting advance to cover the unsatisfied demand index, depending on whether this corresponds to the provision of drinking water or environmental sewer systems.[31] In this last field, the delays are the greatest, both in terms of the capital formation completed (and in its

[31] The example of British firm Thames Water Utilities Ltd. is illustrative in this sense. In the five year period from 1998 to 2003, the firm made capital investments totalling approximately 2.4 million Sterling Pounds (56 percent of this total went to water service and the remaining 44 percent to sewer systems). For more on this case, see OFWAT (2004b).

relationship to that agreed to with the corresponding licensees), and with respect to the unsatisfied needs of the population.[32]

Although the treatment and analysis of the principal financing modalities utilized by water and sewer companies included in this investigation were mentioned in Section II, it is useful to investigate which firms have utilized such mechanisms to finance their investments (Table Nº 8).

According to the information available, it can be generally argued that in the universe of companies analysed here, there are four types of phenomena that arise from the predominant financing forms. The first is comprised of the companies that have privileged the contribution of third party resources, especially in terms of acquiring debt on the domestic and/or international market (this is the case of the service providers in the metropolitan area of Buenos Aires and of Brazilian firm Prolagos). The second includes licenses in which a considerable proportion of the capital formation of the firms has been financed with state contributions and/or subsidies (Athens and Cochabamba). The third is made up of those firms that have financed a great part of investments with their own resources (Aguas de Limeira S.A.). The forth corresponds to the companies that have recurred to more than one source of financing (this category includes service companies in Aguascalientes, in the cities of Finland, and in Niterói and London – in these cases, investment "credit" came fundamentally from revenue accounts, public contributions and/or debt acquisition, although in varying proportions).[33]

[32] This phenomenon tends to repeat that confirmed by the Inter-American Development Bank in Latin America and the Caribbean (Inter-American Development Bank, 2003).

[33] As can be seen on Table Nº 8, with the exception of Aguas Argentinas S.A. (according to information from this firm, between 1993 and 2001, approximately 76 percent of profits were reinvested – however, the aforementioned document of the ETOSS states that "Aguas Argentinas S.A. opted for a capital structure with a level of debt acquisition superior to that foreseen in the offer, as well as exceeding the level of debt acquisitions appropriate for such companies at the international level.... The specific law was again flexible in favour of the company when the contract was renegotiated from 1997-99, when debt levels higher than those acquired by the company were accepted, and thus the company avoided contributing its own capital to cover the financial demands of the license") and the Companhia Águas de Niterói (where there were high levels of profit reinvestment), in most cases analysed, the reinvestment of the surplus generated during service management has been reduced or even null (either because the companies declared losses – as occurred in the case of Tucumán, Cochabamba, Limeira and Prolagos– or, as in Greece and England, because shareholder decided to implement a "generous" dividend distribution policy).

Table Nº 8. Principal financing mechanisms of the water and sewer system investment in a selected group of cities/areas

City/Region – Company	Financing mechanisms	Reinvestment of profits
Metropolitan area of Bs. As. (Argentina) – Aguas Argentinas S.A.	Nearly 70 percent of the capital formation was financed with third party resources (debt acquisition, usually abroad), while the contribution of the firm's own resources was minimal. In these cases, no capital formation came from recapitalization, but from revenue accounts.	According to information from the firm, from 1993-2001, it reinvested 76 percent of its profits.
Tucumán (Argentina) – Aguas del Aconquija S.A.	The financing costs for infrastructure geared to extending the water and sewer system network and to ensuring the quality of service as agreed in the original contract were mainly paid by users. This was achieved through a phenomenal rate increase approved soon after the license began with a charge that was paid per infrastructure (250 pesos/dollars per property for a connection to drinking water and 300 pesos/dollars for financing the drainage network and sewers). In any case, due to the intense social conflict caused by the rate increases, none of the planned investments were made.	There was no reinvestment, since the licensee faced losses during the entirety of the license.

Athens (Greece) – EYDAP	Although different financing mechanisms are acknowledged (own funds, increases in the capital quota, capital market, etc.), the reality is that a great part of financing came from public contributions.	In spite of the important public resources transferred to the company, delays in investment after the partial privatization led to an absence of reinvestment (to this we could ass the "generous" dividends distribution policy that was implemented for private shareholder).
Aguascalientes (Mexico) – Concesionaria de Aguas de Aguascalientes S.A. de C.V.	Fundamentally, via consumer rates, public contribution and debt acquisition (especially in the initial period before the 1996 contract revision).	No information available.
Cochabamba (Bolivia) – SEMAPA	In 1994, nearly 20 percent of the capital formation was financed by contributions from the National Treasury, while in 2000, this financing rose to nearly 60 percent (in both years, the service was rendered by the public sector).	From 1994-2003 (that is, during both the public and private administration), the company suffered losses, and thus there was no profit reinvestment.

Finland* – LV Lahti Water Ltd. And Kangasala Municipality Water and Sewerage Utility	Initially, the towns financed expansion projects through taxing, but since the 1980s, financing has come mainly from water and sewer charges (the financing can also come from municipal subsidies, and from subsidies from the Finnish government and from the EU). In 2001, revenues at LV Lahti Water Ltd. Allowed the company to finance its own investments. In the case of Kangasala Municipality Water and Sewerage Utility, in 2000, a significant part of the investment was financed by the town.	Although there is no specific information for this case, the reduced dimension of the populations served and the fact that an important part of financing comes from the firm's incomes and/or municipal contributions, it can be concluded that the levels of reinvestment needed to maintain a working infrastructure are quite low.
Limeira (Brazil) – Aguas de Limeira S.A.	65 percent of the company's financing comes from its own resources and 35 percent from other sources (no information available on the origin of this financing).	There has been no reinvestment, given that the licensee has lost money since it began offering service.
Niterói (Brazil) – Companhia Águas de Niterói	The principal financing sources include contributions from the Banco de Desarrollo Estatal, the contribution of shareholders and profit reinvestment. In 2000, 65 percent of the investments made was financed with the firm's own resources.	Although there is no information available, the firm's profit margin and the decisive contribution of its own resources for financing investment suggest a high level of reinvestment.

Prolagos (Brazil) – Prolagos S.A.	The little information available suggests that in the past few years, the firm has opted for debt acquisition on the local market to finance investments.	The company has only registered operational and accounting losses.
London (England) – Thames Water Utilities Ltd.	Fundamentally, via resources derived from service invoicing and debt acquisition (at the end of the 2002-2003 fiscal year, the company's net debt totalled approximately 2.3 billion Sterling Pounds – the evidence available suggests the existence of an high proportion of self-loans).	According to the information offered by the regulating entity (the OFWAT), in the past few years, the company has had a very "generous" dividends distribution policy.

* Includes the following cities: Lahti, Kangasala, Lapua, Nurmo, Kuortane and Kauhava.

In short, there are many considerations in terms of the mechanisms chosen by the firms to finance investments. However, the principal conclusion of this section is that the majority of the cases considered show that capital formation has been far below that originally agreed to. This is noteworthy, given that water and sewer services are probably the public utility with the highest incidence on the quality of life of the population. In this sense, deficits in terms of verified capital formation – especially in countries with low levels of development – doubtlessly constitute one of the greatest challenge to resolve in the near future. This is even more true if we consider that these deficit end up affecting the socio-economic strata with the lowest incomes.[34] In other words, the social costs of exclusion are higher, in some cases, than generous dividend distribution policies, ignoring the rational use of the resource, less predisposition to face environmental sewer works (which are generally more costly and less profitable), etc.

[34] Although it is not related to the goals of this study, it is useful to note that the involvement of public authorities will play a decisive role in the resolution of the aforementioned deficits (this role involves designing and implementing policies for sector expansion, the precise definition of the most relevant works, a strict control over the mechanisms to finance investments, etc.).

Principal Economic and Social Impact

Before reaching the main conclusions that can be drawn from the analysis on the economic-financial dimension of water and sewer service providers in the international experiences included in this study, it is useful to incorporate certain considerations on one of the central aspects of the performance of these companies: their diverse impact on certain social, economic and macroeconomic variables that are particularly significant. Although these are not directly related to the economic-financial dimension at the microeconomic level (in terms of respective performances in this area), they constitute one of its many results. In other words, this involves the effects of the operator on the labour market, on income distribution, on the economy's ability to compete, on the fiscal treasury, etc. In short, these are sensitive variables from a systematic vision of the management of drinking water and sewer drainage.

In this area, the asymmetric nature of the basic information (which is not easy to obtain and/or update) for a global and rigorous examination of the phenomena at hand leads to considerations of a qualitative nature (and are thus mere approximations) that arise from the different case studies.

Therefore, with regards to the impact of service provision on the labour market, we can distinguish three major typologies. The first, in all cases (even in those that ended with the rescission of the contract – as in Tucumán and Cochabamba) is associated with the transfer of service management to private capital: this denotes a marked shift from overemployment to important increases in average productivity (this occurred at both Aguas Argentinas S.A. and at Aguas de Limeira S.A.). A second phenomenon is seen in the cases of mixed operations (as seen in Athens beginning in 1999) or state-run operations (different cities of Finland): in these cases, there have been no major effects on the level of employment. Finally, the experiences of the Companhia de Aguas de Niterói and Prolagos S.A., both in Brazil, reveal a growing level of employment, at least over the past few years.[35]

In any case, consistent with what we would expect (linked, in many cases, to management failures – a tendency to overemployment, a traditional twist at many public utilities firms that are state-run), the transfer to private firms has meant a lower level of demand of direct labour (the usual recurrence to outsourcing certain activities does not allow us to evaluate the effects as a whole) and most likely, relative increases in labour productivity.

Whatever the indicator (direct or indirect) to consider, the effects on income distribution or, in other words, the evolution of average service rates via-a-vis the local price indexes and/or average salary indexes comes out as a more or less general phenomenon. The examples offered by Aguas Argentinas S.A.[36] and the rescinded

[35] In the case of Great Britain, the evidence available indicates that as a product of the implementation of important reductions in the number of personnel as a result of the reforms to public companies that began in the 1970s, private firms that took over the water and sewer services in England and Wales received "rationalized" companies in terms of the number of workers (Castro, 2003).

[36] Thanks to multiple renegotiations of the original contract, the average residential rate paid by users rose 76 percent in real terms between May 1993 and the first few months of 2002. As could be expected, when combined with the new rate charges and the scarce distribution of meters, this had major regressive implications in terms of income distribution. In this respect, Azpiazu and Forcinito (2004) mention "the

license contracts in Tucumán and Cochabamba (whose institutional crises were owed to excessive rate increases applied by the companies – in both cases, in a context of strong economic and social crises in which the levels of poverty rose considerably; see Crenzel, 2003, and Crespo *et al*, 2004) are extreme. In the majority of the experiences analysed here, the presence of real rate increases can be detected, both in terms of local price indexes (with the resulting impact on the relative price structure of each economy) as well as salary indexes. Thus it is clear that in all of the remaining experiences analysed, in terms of income, the users with the lowest income pay proportionally more for service than middle and high-income sectors.[37]

In relation to the latter, the regressiveness in terms of rates seems to be a common denominator for diverse reasons,[38] with the exception of the Finnish towns included in this study (according to the data available, the Finnish towns attempted to preserve the economic-social impact of rate behaviour; see Seppälä, 2003). In various cases, the adoption of rate criteria that, even in the examples in which these are compensated with different social rate mechanisms, imply the consolidation of certain regressive twists can be added.

The considerations involving the verified impact on the capacity to compete of each economy are not substantially different. In this sense, setting aside the rate issue and referring to the metropolitan area of Buenos Aires, the World Bank itself has emphasised that the impacts on the living and health conditions of the populations, in addition to those related to water supply and environmental contamination, have had negative consequences on the domestic market competitiveness (this could also be noted for the majority of the cases included in this study – especially those of underdeveloped countries; see World Bank, 1999).

Finally, it is useful to add some brief comments related to the impact that the licenses analysed had on governments´ public finances (national, provincial, or municipal governments, depending on the case). In terms of the data available, there is an initially positive effect (especially at the companies that registered accounting profits) derived from the costs transferred to the population in the concept of taxes (profit taxes, municipal taxes, etc.). In some cases, resources were increased by charging taxes on the economic use of public assets (this is what occurred in the case of Aguas de Limeira S.A. y la

notable concern caused by the current rate structure, in that the strong – and growing – gravitation towards different fixed charges incorporated in the renegotiations make the real service costs fall disproportionally according to income strata. Thus, for 10 percent of the population of Greater Buenos Aires with the highest incomes, paying for the service represents just 1.3 percent of their resources, while on the opposite end, for the group with lowest incomes, water service represents 9 percent of their already deteriorated resources (for the average user, this percentage drops to 1.9 percent." On this particular case, see also Arza (2002).

[37] For more in this respect, see Castro (2003), Kallis and Coccossis (2003), OFWAT (2004a), Torregrosa et al (2003) and Vargas (2003).

[38] Among others, the proliferation of fixed charges in the case of the license of the metropolitan region of Buenos Aires; the notable and asymmetrical rate increases – which were not compensated by the application of the 1999 efficiency coefficient – in the case of England; the connection charges that went from representing 65 to 164 percent of one month of minimum wage from 1994 to 2003 (Limeira), and the fact that connection costs are equivalent to approximately one month of minimum wage (Niterói).

Companhia de Águas de Niterói).[39] In other, public revenues were affected – in this case, negatively – by the direct subsidies that the public sector offered the service operators (the case of Athens and Aguascalientes).

In short, despite the heterogeneous cases reviewed (in terms of scales, type of management, successes and failures, etc.), the principal economic and social implications of the privatisation processes lie (especially in those cases which have not been accompanied by solid legal and regulatory institutions) in the consolidation, and often in the exacerbation, of certain regressive aspects and/or aspects that do not coincide with the economic-social trends that are needed and that must be implemented in order to achieve the goals set by the United Nations for 2015.

Final Thoughts

In closing, grounded on the evidence analysed, it is interesting to bring up certain general considerations on what has been already mentioned and/or suggested with regards to the decisive effects that drinking water and environmental sewer systems have on the living conditions of the current population and future generations, on an economy's ability to compete, on the rational use of resources, and on the environment, among others. It is no coincidence that the United Nations recently declared water to be a *fundamental human right* and that the organization has declared that one of the principal challenges of this century is to considerably decrease the (currently high) number of people who do not have access to this essential public service (either because they lack the sufficient resources to pay for it and/or because, for different reasons, they do not constitute a "profitable market group" in microeconomic terms – this last issue is usually more significant in the case of services offered by a private operator).

With respect to these issues, in terms of the international experiences analysed here, it was possible to verify that the aforementioned deficits in terms of expanding drinking water systems and especially sewer systems are particularly acute in developing countries. In addition, the socio-economic strata with the fewest resources are most hardly hit by this problem for two basic reasons. Firstly, because the rates paid by these poorer sectors are quite high in comparison to their incomes. In other words, low-income sectors must use a greater portion of their (much) lower income to pay their bills in comparison to medium and high-income users (in spite of the fact that in the majority of the cases studied, rates and rate structures responded to progressive criteria). The second reason is that the insufficient coverage of the unsatisfied demand is not preponderantly focused on this segment of the population; the same can be argued of the various deficiencies that are usually part of the service (among others, this includes the quality of water delivered, the operations of the sewers, the fact that environmental issues are ignored, and a management of water resources that only produces deficit). On another

[39] n the first case, beginning in January 2001, the licensee had to pay taxes (in fact, this is a regulatory percentage) of a little under 10 percent of monthly invoicing. In the second case, according to what was established in the contract, after the thirty-first month of the license, the firm must pay a little over 3 percent of its monthly invoicing. In terms of Prolagos S.A., the firm originally was obliged to pay a tax, but this tax was eliminated in the contract revision of February 2002 (Vargas, 2003).

level, and taking into account the economic development studies and the respective profiles of income distribution, many of these problems are also reproduced in the experiences that correspond to developed countries.

In fact, independently of whether or not the services are offered by the government, by private firms or by mixed companies, it is unquestionable that the extension of networks, the improvement of the treatment of sewer effluents, the construction of new plants to make water drinkable, etc. are desirable aspects in itself. This is true not only in terms of improving services in both quantity and quality (and thus reducing the above mentioned deficits), but also for the direct – and positive – impacts that this would have on distributive equity and on social solidarity for both the current population and the generations to come.

This last point is closely related to the issue of financing or, more specifically, with the response that the next questions demands: what resources are available to make the required investments? To simplify, there are five large instruments (that can often be used simultaneously) to finance the growth and development of the infrastructure necessary to efficiently provide drinking water and environmental sewer services: private contributions, funds from international organisations, national resources, some mechanisms for crossed subsidies among users and/or some modes of social interest rates. The analyses presented in the previous sections, in addition to the abundant information available, allows us to conclude that in the specific case of developing countries (which, it must be emphasised, is where the principal sector "bottlenecks" are found; thus this is also where the efforts must be focused to at least partially achieve the goals established by the United Nations for 2015), the first three tools mentioned were not sufficient and/or are not recommendable for a series of reasons (for example, the instrumentation of private strategies – supported, by action or by omission, by public regulation – to prioritise dividend distribution among shareholder and reduce profits reinvestment, the growing external dependence that characterises the majority of the nations on the periphery, and the often critical situation of public finances).

In view of this situation, the two most interesting, economic, and equitable mechanisms from an economic-social (and even financial) perspective to expand service and improve its quality seem to be the implementation of crossed subsidies and/or solidarity rates that favour consumers with the lowest incomes. The formulation and implementation of crossed subsidies (and the more explicit and transparent, the better) in favour of low-income users could come as a relief to many households that are not able to pay their bills and thus often face having their service suspended. However, it is nearly impossible to consider that this measure alone will be enough to attain universalisation in the access to drinking water and sewer systems and/or to avoid (or considerably reduce) late payment and non-payment, which often leads to the suspension of services. This is why it is critical for a crossed subsidy policy to be accompanied by a regime of solidarity rates.[40][41]

[40] Azpiazu and Schorr (2003b) present a series of strategies for financing the application of a social interest rate.

[41] In view of achieving the aforementioned goals of distributive equity and the expansion of the water and sewer system network, in addition to the rational use of water as a resource, the increase of the levels of micro-measurements is another important challenge to confront.

The combination of both measures (included, naturally, within an organic, sustained, and sustainable plan of development and water resource management) would allow users with greater purchasing power and consumption to finance the expansion of service towards low-income users or users that have problems to pay their bills or no access to service.

Finally, it is necessary to add one last digression that arises from the different analyses. One of the principal suppositions of the privatising models supported mainly by multilateral credit organisations is that, especially in the water and sewer sector, privatisation per se is the necessary and sufficient method to extend service and to thus increase the efficiency of such services.[42]

However, the long list of international experiences analysed in this study create more doubts than certainties in this respect. Our research appears to support a statement made by two specialists who analysed the British privatisation process in depth: "When there are mass economies of scale and scope and elevated barriers that block – or appear to block - the entrance, private property does not produce positive results. The incentive and opportunity to exploit consumers threatens the efficiency of the assignation, and the absence of competitive norms leads to inefficiency and internal negligence…. [Thus] the water industry appears to be the most dangerous in terms of privatisation, since it combines a lack of concern for the environment, a natural monopoly, and reduced investments in infrastructure. Although there could be a margin for outsourcing certain operations (for example, drain treatment and pipe maintenance), in general, there is little to be gained from privatising the water industry, and many problems await if this industry is privatised. We would maintain public ownership of the industry assets and uphold the principle of the integrated management of fluvial basins" (Vickers and Yarrow, 1991).[43]

[42] After playing an active role in the formulation and implementation of market-oriented reforms for many years, and as a result of the many critiques of the privatisations made from different realms due to their blatant economic and social implications, the World Bank itself recently acknowledged that privatisations has not had the effects expected for local populations (these effects, it should be noted, were once widely publicised as a justification for transferring public assets to the private sector. For more on this issue, see Kessides (2004).

[43] Along these lines, these authors emphasise certain "negative effects for the efficiency of the economy" that are produced by the privatisation of the "water industry": "the loss of economies of scope as a result of giving up integrated management of fluvial basins...; the probable effects of placing private decision criteria above social criteria when evaluating the need to measure (or not to measure) domestic water supplies; the establishment of an industrial structure less favourable to promoting competition...; the incentives of private companies to reduce service levels and the difficulties that regulators face to stop them;... and the danger that, due to a lack of clear long-term policies to stop unrecoverable dividends from going to private shareholders (a common policy), capital expenditures in the industry could be too low," (Vickers and Yarrow, 1991).

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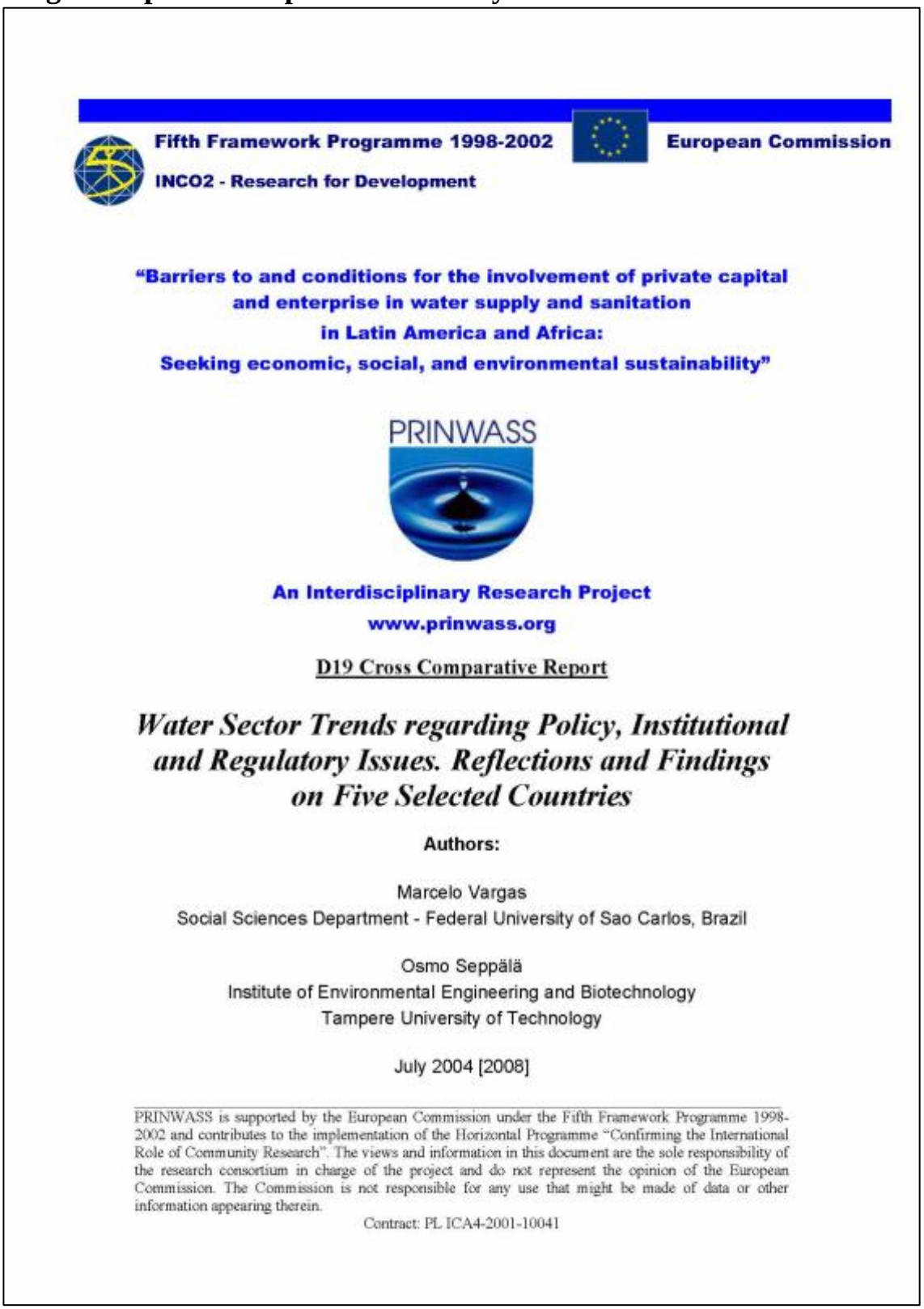

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D19 Cross Comparative Report

Water Sector Trends regarding Policy, Institutional and Regulatory Issues. Reflections and Findings on Five Selected Countries

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ARTICLE 3

Cross-comparative Report on the Policy and Institutional Dimension

Water sector trends regarding policy, institutional, and regulatory issues. Reflections and findings on five selected countries

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The analytical and comparative work we developed in this report is mostly based in empirical data previously collected and analysed by our partners and ourselves for our PRINWASS case studies. Our mutual readings and discussions with all the team of this project's researchers help us to develop the overall vision of WSS services policy, institutional and regulatory issues we develop here. So, being grateful to all of our partners, we would like to express our special thanks to Dr. Esteban Castro, for having invited us not only to participate of this stimulating research project, but also to coordinate this specific and challenging comparative report. Last but not least, we are very grateful to the partners that directly contributed to the descriptive and comparative work carryed out here by giving us specific information and answering our queries related to their respective country's case studies, as Daniel Azpiazu and Emílio Crenzel, for Argentina, Ezekiel Nyanchaga, for Kenya, and Jarmo Hukka, for Finland.

Special Contributions

Ezekiel N. Nyanchaga: "Water Services in Kenya: national policy, strategies and legislation" (July 2002), PRINWASS unpublished working paper, 29 p.

Jarmo Hukka: "Water Services in Finland: national policy and legislation" (September2003), PRINWASS unpublished working paper, 13p.

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Introduction

This document is part of a series of six thematic Cross Comparative Reports (CCRs) conceived under PRINWASS research project to address strategic issues for assuring water and sanitation services' economic, social and environmental sustainability, especially in those developing countries which give private sector participation (PSP) an important role in their policies for this sector.[3] It is focused on policy issues, legal and institutional aspects related to provision and regulation of these services, paying special attention to related trends observed in a selected group of countries studied by our project. This group of countries presents differentiated political, social, economic and cultural features among them, as well as diversified forms of private involvement in water sector showing different stages of development and contrasting outcomes. The report covers two developing countries from Latin America (Argentina and Brazil) and one from Africa (Kenya), as well as two developed European countries (Finland and the United Kingdom), trying to assess how different development conditions may affect government's capacity to formulate, implement and enforce appropriate policies for water sector as a whole. Focused on these, the main objectives are:

- To identify what are the cornerstones and the reference models for each studied country's WSS services policy and regulatory framework, seeking to highlight their main structural and socio-cultural similarities and dissimilarities;
- To investigate the origins of such models, trying to understand how they were conceived and implemented and how they are being changed or reformed in each country, under specific political and economic constraints coming from internal and external pressures;
- To evaluate what are the strengths as well as the shortcomings and inadequacies of current policies and institutional framework for WSS services provision and regulation in those countries, including the proposed reforms to them, trying to identify what needs to be changed or improved to assure services socio-political, economic, environmental sustainability.

As we have already discussed in our PRINWASS baseline report D2 (Seppälä, 2003a), the international interest for partial or total *privatisation* of public water and sanitation services, under varied institutional arrangements,[4] has been increasing remarkably since the early 1990s, especially in developing countries from Latin America,

[3] The other CCRs are respectively related to Environmental Sustainability (D15), Geo-demographic and Urban Development (D17), Infrastructure and Technology (D18), Economic and Financial (D20) and Socio-political and Cultural (D21) issues involved in PRINWASS case studies. Originally, there was a D16 focused on water sector trends that we decided to merge into D19.

[4] The word privatisation is employed here as a generic term to designate the various forms of private sector involvement on WSS that we may deal with in our research, including not only full privatisation (asset divestiture) and private operation, but also measures such as outsourcing core and non-core activities, incorporation of public utilities, commercialisation, operations of (small) private water companies, associations and co-operatives, among others. Some interesting typologies of PSP diversity may be found in Hukka & Katko (2003)

East Asia and Africa (in this order). Such a growing interest may be partially explained by transnational corporations' and financiers' (historically recent) perception of water services as a prospective business investment with guaranteed profit and relatively low risks. But it also corresponds to an ideological shift, started in the developed world around the late 1970s, which replaced the state by the market as the key actor for economic development (Castro, 2002). This shift, which is rooted on structural changes of contemporary capitalism (mostly the fiscal crisis of states, after three decades of welfare and Keynesian politics, and the rise of global financial markets),[5] was put into practice first by the conservative governments of president Reagan in USA and Prime Minister Mrs. Thatcher in the UK along the 1980s, being spread afterwards to the developing world along the 1990s, as a consequence of the ideological hegemony of the so called "Washington Consensus".[6]

In fact, we may speak of a "privatisation boom" in developing countries' water sector which have started after the mid-1990s, under the influence of major multilateral donors and external support agencies (Seppälä, 2003a), despite recent changes they have adopted in their pro-market discourse, which is now much more relativistic and critical (see, e.g., Stiglitz, 2002), as remarkably noticed by Castro (2002). Therefore, we may suppose, as Seppälä (2003a) does, that "international agencies and countries have begun to have much more interaction and cooperation with regard to development of water policies and strategies" by the end of 20th century, generating "global and supranational strategies and visions". Furthermore, we may also observe, following both authors, that these strategies and visions continue to be dominated by pro-market policies promoted by the most important multilateral and external support agencies.

Implementing such policies is often imposed on indebted developing countries by IMF, IBRD and many other development banks as a condition for granting loans or debt relief aids; and strong dependence on external capital flows is actually a common feature of almost all developing countries from Latin America and Africa, whose state's investing capacity and national currency stability are constantly pressed by external debt's service. Yet, we may not take for granted the *hypothesis* that those countries water policies are equally shaped by "donor dominance". Although receiving similar influences from international donors and funds, and passing through similar economic constraints related to external dependence, the situation is quite differentiated between Latin America and Africa (where the lack of technical and human resources is much greater), as much as between specific countries from each continent. One of the main challenges of the comparative analysis we try to make here is precisely to establish the common and specific conditions behind each studied country's peculiar institutional and regulatory framework for past and current water policies.

Thus, we have made the following research questions that we try to answer: What does it mean to regulate a public utility service? On whose behalf or interests is regulation

5 For a good analysis of this shift's structural roots and cultural expression, see Harvey (1990).

6 This expression was created in the late 1980s by John Williamson, then a member of the Institute for International Economics, as referring to an ensemble of measures related to market liberalisation, privatisation and deregulation which are seen by the USA government and the international agencies whose headquarters are located in Washington – mostly the World Bank, the IMF and the IDB 🎗 as necessary conditions to be filled out by all countries submitted to IMF economic adjustment policies.

made? What are the main existing international and national policy models for WSS provision and regulation? How such models were conceived and implemented in the corresponding countries? Where and to what extent may we find exogenous pro-market policy models being unilaterally implemented as a sort of "strange body" on the socio-political and institutional environment of a developing country? What level of resistance or rejection such models have generated in those cases, among which stakeholders and social groups? Conversely, where and to what extent may we find such exogenous models being submitted to a sort of "acclimatization" to become adapted to national culture and institutions, therefore generating cross-bred or blended models for water sector policy and regulation? What may be considered an adequate institutional and regulatory framework for public utilities, especially for WSS, and when (under which conditions) may we affirm that it is being actually implemented anywhere?

The theoretical elements which may allow us to deepen (but not yet to fully answer) the questions above are discussed in the first section, which briefly reviews some findings of the pertinent literature about utilities' policy and regulation. In the second section we present the analytical framework together with the methodological choices we had to make due to some practical constraints to develop our comparative analysis. The third section presents some descriptive elements necessary to analyse and compare each country's changing institutional and regulatory framework for current water policies, and it may be seen as an essential step for answering the questions formulated above. In the Conclusions we seek to systematize our theoretical findings and the clues for our comparative analysis to finally give the best answers we can to the questions formulated above. We also propose new questions that may be relevant for further investigations.

Theoretical considerations about policy, institutional and regulatory issues for WSS services

Although the promotion of PSP has become a policy directive internationally dominant in this field since the early 1990s, especially on the discourse and the strategies of major multilateral and external support agencies which grant aids, credits and assistance to developing countries, the debate about the roles and the potential cooperation between the public and the private sectors in the provision of water services is certainly not new. In fact, as we have observed in D1 (Castro, 2002) and D2 (Seppälä, 2003), heated debates about those issues were already held between the late 1800s and the early 1900s in the developed world, when started a long standing political move against the insufficiencies of the private provision of most public utilities services, which had prevailed until then under the auspices of capitalist liberal states. This move –which was reinforced during the 1930s crisis and after the World War II, under the framework of Beveridgean Welfare States and Keynesian economic policies– favoured not only the municipalisation and/or the nationalisation of most public utilities in those countries, but also the emergency and development of regulatory institutions aiming to assure that public interests are preserved in situations where services are provided by private operators. So, the "recent" shift towards pro-market strategies involving services' privatisation, commercialisation and deregulation, which started by the end of the 1970s, with the fiscal and political crisis of the Welfare States and the rise of globalisation and neoliberalism, represents nothing

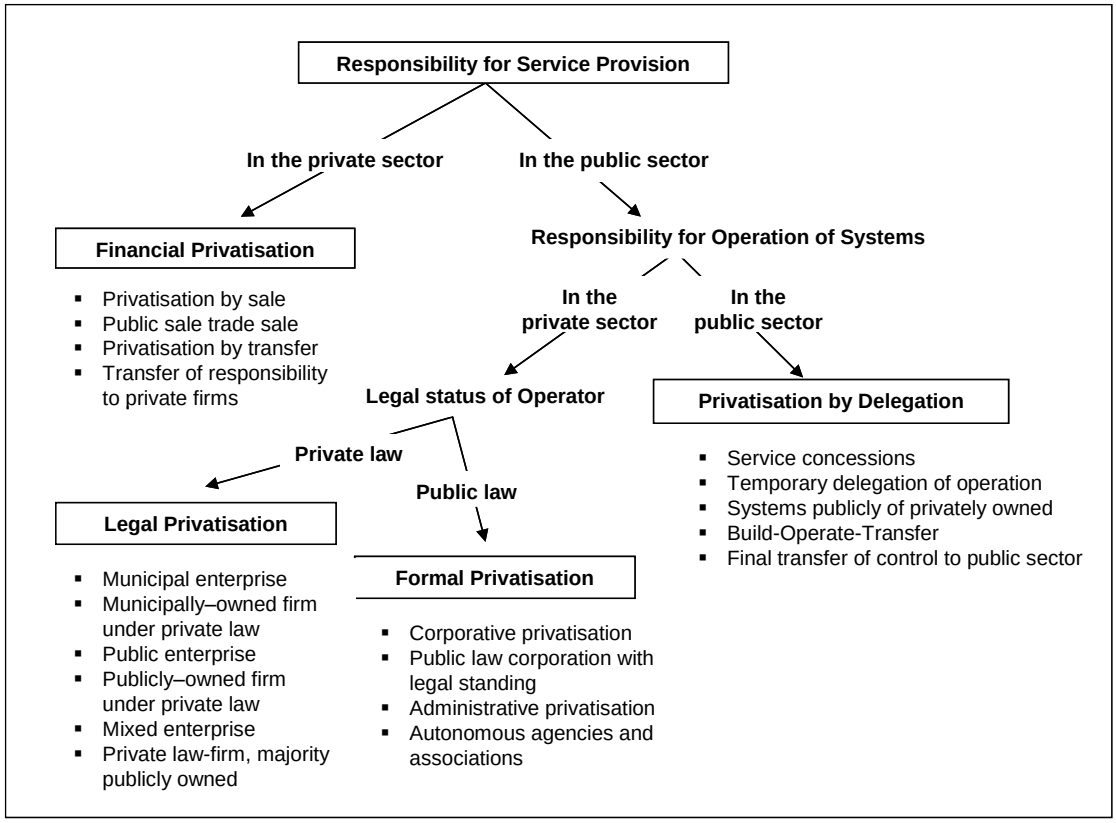
more than another particular stage of the historical cycle of privatisation-nationalisation of public utilities services that we may observe in different countries and regions at different moments.

Anyway, we should not think of those shifts from public to private provision and vice-versa only as a result of political and ideological changes in society, but rather as a dynamic process often related to the services own financial and management bottlenecks. In other words, instead of conceiving an oscillating movement between two fixed poles, we should rather consider the historically entwined and dynamic nature of public-private relationship in this field, searching to analyse the institutional diversity of management and regulating options for WSS services we may observe nowadays in different countries, and trying to understand its origins and evolution.

Institutional and management options for WSS services provision

In most cases, a WSS system is under the responsibility of a single public, private or community operator. Figure Nº 1 provides a provisional (and incomplete) typology of utility regimes, in terms of the type of PSP or privatisation.

Figure Nº 1. A typology of privatisation

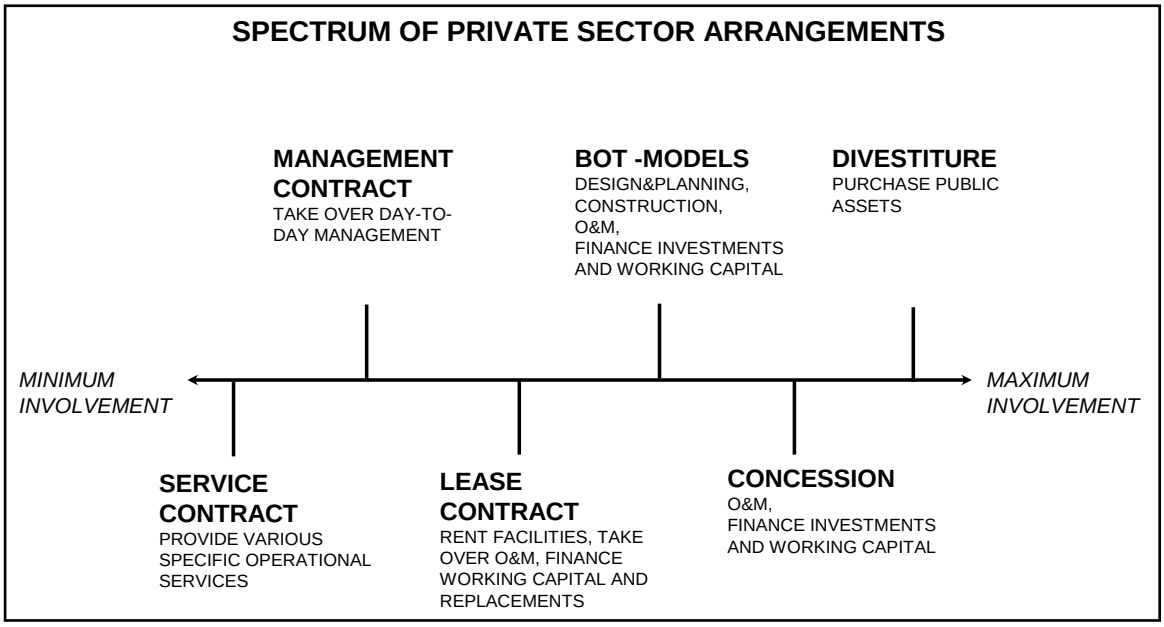


Source: modified from Kraemer, 1998: 335.

Despite its utility as an illustrative picture of the institutional diversity involving PSP in WSS services management, which shows that "privatisation" may follow different ways and assume diversified organisational forms, the scheme represented above at Figure Nº 1 may be seen as excessively focused at the systems' operational level: if we consider the whole political and institutional environment of public utilities in a modern state, we must recognize that governments remain the main responsible for services provision in all cases, as it may not delegate its obligations concerning the regulation and monitoring of services quality and prices.

Anyway, as we may see in Figure Nº 2, there is a wide spectrum of PSP arrangements in the provision of WSS services and other utilities which reflects different degrees of private involvement in related activities and infrastructure over time. The main features of those institutional options regarding private involvement are summarised in Table Nº 1.

Figure Nº 2. Spectrum of private sector involvement arrangements



Source: Hukka and Katko, 2003.

Table Nº 1. Description of various private sector involvement options

PRIVATE SECTOR INVOLVEMENT
FULL DIVESTITURE Full transfer of assets to private sector through asset sales, share sales or management buyouts. Private sector responsible for all capital investment, maintenance, operations and revenue collection.
PARTIAL DIVESTITURE Government (or any public owner) sells a proportion of shares in an incorporated enterprise or creates a new joint venture company with the private sector.
CONCESSION Government lets a long-term contract, usually over 25 years, to a private company, which is responsible for all capital investment, operations and maintenance.
LEASE Long-term contract (usually 10-20 years but can be longer). Private sector responsible for operations and maintenance and sometimes for asset renewals. Assets remain in public sector and major capital investment is a public responsibly.
BOT (Build-Operate-Transfer) / BOO (Build-Operate-Own) Contracts are issued for the construction of specific items of infrastructure, such as a bulk supply reservoir or treatment plant. Normally, the private sector is responsible for all capital investment and owns the assets until transferred to the public sector, but in BOO schemes, private ownership is retained.
MANAGEMENT CONTRACT Short-term contracts, typically five years. Private firm only responsible for operations and maintenance.
SERVICE CONTRACT- [BUYING IN] Single function contracts to perform a specific service for a fee, e.g. install meters.

Source: modified from Rees, 1998: 15.

The different forms PSP may legally take in WSS services provision in each country, and the corresponding role the public sector may assume under those different arrangements, must be seen as only one of the five structural axes we shall analyse for understanding the institutional framework of water sector policies at any level, which we discuss later. However, as the viability of any PSP arrangement depends largely on the surrounding regulatory framework, we must now advance some theoretical considerations about this policy dimension

The issue of regulation: institutions, origins and reference models

In D1 (Castro, 2002: 44-55) we have already addressed some historical and theoretical aspects of the issue of public utilities regulation, especially those related to economic theory (mostly the main arguments from the Welfare Economics and the New Institutional Economics schools) completed by some elements of political theory concerning bureaucracy and state administration (basically the public choice theory). In the present report we try to retrieve and complete the main points already discussed in D1 that help us to understand the role regulation may play in PSP arrangements regarding WSS services in developing countries.

Historically, the public regulation of economic activities, as we know nowadays, was born in the last quarter of the 19th century, in the United States and Europe, as a reaction to the negative impacts of *laissez-faire* policies promoted by capitalist liberal states, which had favored the private provision of almost all goods and services until them, including public utility ones, without any social or political control. The results of such liberal economic policies proved to be largely unsatisfactory in terms of products' or sevices' quality, security and affordability, usually excluding the poor. The reaction against this situation became a long standing political and intellectual move opposed to free market policies and economics, which gave birth to the rise and development of regulatory theories and institutions.

As concerns the regulatory theories, the specialized literature recognizes two main schools: the "normative" and the "positive" theories of regulation. Associated with welfare economics theories from Alfred Marshall, A. C. Pigou and Paul Samuelson, the former is the oldest and the most influential over regulatory institutions, while the latter, based on a critical approach of welfare theories, was developed by the early 1970s, having influenced most pro-market institutional and administrative reforms (privatisation, de-regulation, PSP arrangements) that came afterwards around the world.

The normative theory of regulation is based on the notion that state intervention is necessary to promote social welfare and public interest in social and economic activities where we may observe different kinds of *market failures* related to structural limitations to competition (*natural monopolies*, *economies of scale* and *sunk costs*[7]); to negative and positive impacts of economic transactions of goods and services over third parties not directly involved, which means costs and benefits not captured by the prices system (*externalities*); to the impracticability of excluding non payers or "free riders" related to indivisible goods or services (*public goods*); or to the special character of certain goods and services considered essential to social welfare that are not usually the

[7] This latter notion refers to the fact that the assets needed to provide most public utilities, including WSS services, are irrecoverable due to their locational specificity: for instance, the owner or the operator of water and electricity networks may not leave a non profitable market and carry with him the assets to provide services elsewhere. Acting as a sort of "exit barrier", this limit raises the problem of political risks to private investors which may be impeded to appropriate the expected revenues by discretionary governmental acts such as assets expropriation. The presence of sunk costs normally entails private underinvestment or lack of investment on such activities. Yet, such barrier may be overcome by building a *regulatory governance* structure which tries to give long standing guarantees of return appropriation to private investors. See detailed discussion later.

target of individual consumer preference (*merit goods*).[8] Considering the limitations or even the absence of economic competition and/or private interest present in all those cases –whose analysis is developed by Roth (1987) and Castro (2002), among many others–, the State should intervene to correct market failures either by means of taxation, regulation and/or targeted public subsidies searching to promote allocative and productive efficiency of such goods and services under private provision and PSP arrangements or, alternatively, by means of directly assuming their provision as part of its social and political duties.

In a critical approach developed by the early 1970s, the positive theory of regulation refuses the analytical validity of categories such as "social welfare" and "public interest", seeing any particular form of regulation as a commitment resulting from negotiations between conflicting interest groups. Having developed ideas from William Niskanen, among other authors from the public choice school, its partisans argue that public sector should not be seen as the guardian of social or national interests, because state officers and bureaucrats act as rational actors in accordance with the same principles of private setor agents, i.e.: trying to maximize their own particular interests and objectives (*rent seeking*) to the detriment of public social or/and economic interests. This behaviour of public agents is the cause of many *government failures* (as overstaffing, underpricing, administrative discontinuity, etc.) which result in strong inefficiencies observed in the state provision of many public utility services around the world, especially in developing countries.

The normative approach of regulation has always been contested in the theoretical field since its origins. The precursors of the New Institutional Economics, for instance, as Coase (1937), proposed that most market failures are related to situations in which *incomplete markets* are detected. Generally associated to imperfect or *asymmetric information* held by actors, who tend to adopt opportunistic behaviour in order to maximise their own benefits to the detriment of other parts involved, such situations increase transaction costs and raises problems as *adverse selection* and *moral hazards*. However, such problems are not specificly related to markets or government, but rather to *organisation failures* that affect certain areas of economic activity which impact the private as well as the public sector. Therefore, the solution for such problems would not be found in the privatisation or the public provision of such activities, but rather in the establishment of an adequate institutional framework regarding contracts and property rights, which would give the appropriate incentives to make economic agents play fair in their negotiations, reducing risks and transaction costs.[9]

The normative approach prevailed in practice until the late 1970s, when it began to be threatened by radical privatisation, deregulation and liberalisation policies promoted by conservative governments backed by multilateral donors and external support agencies under the neoliberal wave of the following decades. However, if those

[8] Some authors also point the presence of asymmetric or imperfect information in some markets as another important market failure, while others also include intertime failures related to to possible long term irrationalities of economic decisions that may be rational in the short term (Farina; Azevedo and Picchetti, 1997).

[9] For a deeper analysis of New Institutional Economics' theoretical contribution to the debate about public utilities regulation, see Vargas, Leme and Lima (2002).

policies intended to reduce or eliminate state regulation, trying to replace it by market auto-regulation, their implementation was sometimes contradictory: in many privatised public utility services, as in the Bristish water industry, the regulation of such services was rather reinforced, in what was known as a *re-regulation move* (Castro, 2002).[10] So, we may conclude that privatisation (or any PSP arrangement) does not have to be linked to deregulation, as some authors argue; the truth may rather be on the other sense:

> Irrespective of the type of privatisation, regulation is required to ensure that natural monopolies are exploited under regulatory supervision and that no abuse of monopoly powers occurs. [...] Privatisation and regulation are therefore linked. Sometimes, privatisation and deregulation are presented as complementary strategies. However, grave consequences will follow when public involvement in the direct provision of urban water services is abandoned without effective regulatory agencies being established beforehand (Kraemer, 1998).

But the need to have public institutions to regulate private provision of goods and services considered essential for society's welfare is not only a matter of public interest, corresponding to private sector's interest as well:

> In order for a PSP to be attractive to the private sector, there are elements that must be in place already in the country. These elements include sector reform by law, allowing PSP; separation of functions among planning, regulation and operation; appointment of a sound and powerful regulatory body; and the design of a regulatory framework to define PSP rights and obligations giving special attention to the users' rights and the environment (Seppälä, 2003: 77).

In fact, when we consider the regulatory institutions which were created mostly along the last century, we may recognize market regulation as an inherent activity of the modern State that may assume diversified forms, according to national and international historical context.

There are many possible typologies for classifying different kinds of regulation, following different principles. We may distinguish, for instance, *structural* and *behavioural* regulation, accordingly to the object of regulatory activity. Applying to the

[10] This author sees two main intellectual currents confronting themselves in the debates concerning regulation of activities provided by private operators: on one hand, the partisans of a "moderate economic rationalism", which defend a strong state regulation to ensure that the objectives of private sector expansion are met; on the other, the partisans of a "Promethean market extremism", which are radically against any kind of public regulation, arguing in favor of market auto-regulation. But, as he noticed, "the Promethean model has only been applied in some developing countries, where the absence of strong state institutions and human capital has meant that privatization and other pro-private sector reforms were implemented in the virtual or actual absence of a regulatory framework. Contrastingly, in the countries where the deregulation, liberalization, and privatization movements started, regulation of public utilities continues to be strong [...]. These contradictions between the rhetoric and the actual processes may cast light on and provide important lessons for the situation in developing countries" (Castro, 2002: 55).We tryed to keep this advice in mind during our comparative analysis.

industry's structure, the former "defines the type of organizations that can participate in a given market, and involves such issues as market share, merger control, vertical and horizontal integration of firms, and the conditions of entry for new incumbents". In theory, it aims "to induce competitive behaviour among the firms participating in the market, and involves the consideration of technological constraints, informational asymmetries, coordination requirements, and transaction costs." Applying to business behaviour, on the other hand, behavioural regulation "deals with the day-to-day conduct of private firms in relation to profit rates, anti-competitive practices, service and product quality standards, and environmental regulation with the aim of ensuring that the public interest is not affected" (Castro, 2002: 52-53). It also involves price controls to protect consumers from potential exploitation by monopoly providers, while simultaneously allowing the industry a "reasonable" rate of return, which may raise many difficulties related to asymmetric information controled by private (or public) operators.

The most common schemes of *economic regulation* established to attain both objectives are the *cost plus* method, based on the control of the ROI (return on investment) rate, most common in United States and Latin-American countries, and the price cap method, based on the control of prices, which was applied in the British water industry after privatisation. The former method allows private (or public) operators to charge a price just over the cost of production, which means that companies only obtain returns on the actual investments made, while the regulation does not guarantee net earnings to the companies. Such system has been criticized on the grounds that "it induces overinvestment and provides poor incentives to minimize costs and innovate, while placing a burden on regulators who need very detailed knowledge of the industry in order to operate efficiently". The price cap method, on the other hand, is supposed to provide stronger incentives for efficiency improvements and innovation. "The system takes into account a complex set of variables including the investment requirements of individual companies and the retail price index to protect revenues from inflation", while price caps are set for medium term periods to induce the companies to improve their efficiency as a means of increasing their revenues by the appropriation of productivity gains (Castro, 2002: 53-54).

We may also speak of *social regulation*, which is related to the public control of health and safety standards as well as to environmental concerns. Such kind of regulation has acquired increasing importance since the 1970s, either in the developed and in the developing world.

For our study's purposes, we are using a more practical classification of strategic regulation areas which distinguishes: i) water services quality regulation, dealing with standards for drinking water and for services technical performance (leak control, expansion goals, regularity, reliability, etc.); ii) economic regulation, dealing with tariffs, profits, commercial and financial performance; iii) regulation of ownership and competition, dealing with antimonopoly legislation and unfair commercial practices which may dammage economic competion; and iv) environmental regulation, dealing with water resources management and other related environmental issues.

Besides the different classifying schemes concerning types of regulation we have examined to this point, all of them focused on a sectorial approach, it is useful to distinguish, after Melo (2001), four typical modalities of *regulatory arrangements*:

- **the public ownership and management of firms** producing goods and services considered strategic for social, economic or political reasons, which became widespread not only in most part of OECD countries after World War II, but also in Latin-American countries, from the early 1950s to the late 1980s, under the emprise of national developmentalist civil or military governments;
- **public regulation of strategic economic activities produced by private owned companies** by State's Ministries or any organ belonging to the executive branch (at national or local level), which means that regulation is placed directly under the control of governments;
- **self regulation** by corporative arrangements; and finally
- **regulation of strategic economic activities of private owned companies by specialized autonomous agencies or comissions**, which emerged first in the United States, as the interventionist side of its typical liberal capitalism, having become widespread in Europe and Latin America after the privatisation wave started in the late 1970s.

According to Melo (2001), the four types described above may be regrouped into two major kinds of regulation: the endogenous one, based mostly on public provision or ownership of assets; and the exogenous or autonomous regulation, based on autonomous regulatory agencies or commissions which may be considered independent from governments.[11] Both modalities of regulation may present their own typical *regulatory failures*, as described in the Table Nº 2 below

Table Nº 2: Typical regulatory failures of the two main kinds of Public Regulation

Regulation by autonomous agencies	Regulation by state provision
Insufficient political accountability of the independent regulatory angency or commission	No effective control of public companies by Congress, Courts or the tutoring Ministry
Capture of regulators by the regulated companies	Capture of public companies by politicians and trade unions interests
Overcapitalization	Overstaffing
Non-competitive regulation	Public monopoly
Diffuse goals refered to public interests	Public managers oriented to ambiguous and inconsistent goals
Weak coordination between different regulators	Weak coordination between different public companies

Source: Adapted from Majone, in Melo (2001)

[11] Market auto-regulation schemes may also be considered as a kind of endogenous regulation of certain activities, but not being really a public regulation, it couldn't be taken seriously in itself as the basis for regulating most public utilities, for the typical monopolistic and socially essential character of the related services. Auto-regulation should rather be considered as part of the auxiliary regulating mechanisms presented on the regulatory environment of societies. On the other hand, we may say that public regulation of those services by organs directly subordinated to governments present more or less the same regulatory failures of the regulation embodied in state provision.

Considering our research objectives, we must obviously discard the analysis of regulation by state provision to focus on the forms of public regulation of WSS services provided by private operators under different arrangements, which may follow either the autonomous regulatory agency model, the one directly subordinated to governments, the one based mostly on auto-regulation, or yet, any sort of blended model which may result from a specific mix of some borrowed features from the others.

Finally, in the discussion of public utilities regulation, we must consider the important notion of *regulatory framework*, which comprises two related concepts: on one hand, the *regulatory governance* structure, on the other, the *regulatory incentives* scheme. The regulatory governance comprises legal and institutional mechanisms society uses to restrain state's discretionnary powers on its regulating activity and to solve conflicts emerging from regulation. The regulatory incentives involve pricing, subsidies and entry control rules, among others, which are supposed to induce agents (private or public operators) to behave in accordance with the public objectives fixed by *principals* (regulators or governments).

The main issue involved in the structure of regulatory governance is the problem of regulator's independence and credibility, as the private investments made on public utilities assets involve a great amount of capital immobilization whose return demand a long period of time and which may be characterized as sunk costs subject to many forms of income "administrative expropriation" (interdiction to update prices, nationalisation, etc.). The delegation of powers to independent regulatory agencies may be seen as a strategy to reduce this kind of political risks.

However, according to Melo (2001), the regulatory governance is strongly conditionned by a country's broader institutional environment, which is composed by its Legislative, Executive and Judiciary institutions, as well as informal rules tacitly accepted by social actors. He argues that political institutions influence the structure of regulatory governance by imposing limits to the discretionnary action of governments:

> "[...] Such limits are established by a variety of mechanisms as the separation of powers; constitutional rules limiting the legislating powers of presidents; federalism, establishing distinct competitions for different government levels; as well as presidencialism and bicameral legislative" (Melo, 2001, p. 46, authors' translation).[12]

However, if regulatory credibility is greater in countries which present strong restrictions to Legislative and Executive discretionary actions, the choices related to regulatory institutional design involve a general trade-off between credibility and flexibility: "the mechanisms that ensure credibility and durability to regulatory

[12] For this author, the stability of regulatory institutions is problematic under Parliamentary regimes, in which the Executive may control the agenda of the Legislative power. Thus, alternating majorities with very distinct political agendas would weaken the credibility of regulatory arrangements, as changing government may lead to changes in laws (Melo, 2001: 65). Off course, it doesn't mean that parliamentary countries may not have stable political and regulatory institutions, based on other principles.

institutions are the same that hinder the institution of new rules that may be necessary to face technological and social inovations" (idem, ibidem).

Despite its crucial relevance, the issue of regulation must be considered as only another one of the five structural axes we have to analyse for understanding the institutional framework of WSS services policies at any level, according to the analytical framework we develop below on section 3.3. Before that, we must consider the issue of policy models involved in the provision and regulation of such services.

WSS services policies: what role for national and international models?

Our previous considerations seem to indicate that there is a great variety of institutional and management "options" for services provision and regulation, which involve different arrangements concerning private sector involvement and the role of the State. In fact, the use of such a word may be very problematic, so much as the term model, which frequently appears in the debates around privatisation and PSP policies for WSS services that are being actually implemented or discussed in developing countries, generally backed by multilateral donors and external support agencies. In such debates is not unusual either to hear about the virtues of the American (or Anglo-american) model of utilities regulation, or to hear a discussion opposing the French model of privatisation, based on different kinds of contractual arrangements involving services delegation by local authorities, and the English model, based on full divestiture with private operators regulated by independent regulators, both being presented as a sort of reference models for pro-market policy building and reform. But what is the nature of such reference models? To what extent may they be transfered, imitated or adapted to work on different social and institutional conditions?

Although there is a reasonable margin for discretionary governmental action for elaborating and implementing new policies, or reforming old ones in almost any activity field, we must consider that no policy can be conceived as a pure model whose inherent qualities are independent from its broader socio-political and institutional framework: on the contrary, according to the lessons from the New Institutional Economics, the full implementation of any policy depends on recognizing and mobilizing the social capital present in formal and informal social institutions, as we discuss briefly below.

In order to deepen our discussion about policy reference models, we must reflect some more about the concept of institution as our point of departure, while the notion of social capital may be left to close our reflections on this issue.

From a sociological stand point, institutions are durable collective rules and patterns of action sanctioned by society, which are based on a consensus historically build under specific social and cultural conditions; as such, they may not be easily transfered from a national context to another. From the stand point of the New Institutional Economics, institutions may be considered formal and informal collective rules of behaviour involving laws, contracts, conventions, mores and codes of conduct which regulate human interaction and limitate individual choices. The definition of such rules help to reduce the transaction costs and may be considered the source of economic incentives to which individuals and organisations may react in a predictable way, according to the notion of bounded rationality. Following this school, it is useful to

distinguish institutions as refering to the collective formal and informal rules from the common sense notion of institutions as corresponding to any public or private organisations. As argued by Douglas North (1990), different collective organisations interact with eachother and influence the institutional environment, but are not the institutions themselves: "The organisations are created puposefully according to the ensemble of opportunities that result from the existing [economic and institutional] restrictions, and as they pursue in their attempts to realize their own goals, they are important agents in the process of institutional change" (North, cited in Kember, 1996: 33).

In our reflections about policy building and reform concerning WSS services in developing countries, it may be useful, after Kemper (1996), to use the expression *institutional arrangements*, instead of institutions, to refer to the "rules of the game", as well as to consider this arrangements together with the actors (organisations) as the *institutional framework* which involves such policies.

In this connection, what is refered to as the French or the English model of pro-market WSS services policies consists rather in stable institutional arrangements regulating the respective roles of public and private sector in this field, at different levels, which are rooted in specific features of each country's political culture. As such, they may not be isolated from their institutional and political environment, out of which they may not work as expected. So, it would be more appropriate to think of them as national experiences that may be understood under the notion of social capital, as well as many other national stable patterns of services management we know.[13]

The notion of social capital, conceived by Putnam (1993) as complementary to the approach of institutional economics, explain why some institutions or institutional arrangements may function better than others as stable rules for regulating collective action. It refers to the fact that efficient institutions are conditionned by the density of social interaction between collective actors and networks, involving long standing relations of thrust and shared commitments based on historical and cultural roots: "social capital accumulation facilitates coordinated actions, stimulates spontaneous cooperation and inhibits oportunist behaviour" (Putnam, 1993: 179). Although it may be criticized by its strong cultural determinism, Putnam's conception of social capital and its tributary notion of *path dependence*[14] suggests the need to analyse the evolution and actual status of the institutional framework that involves any policy in force not only to understand its potential and limitations, but also to evaluate its possibilities of changement.

Taking into consideration the notions of institutional arrangements and social capital examined above, we may understand why the adoption of exogenous regulatory models or the imitation of regulatory reforms which were successful in a given environment may give way to unsuccessful experiences. As suggested some good institutional economists:

[13] We could mention, for instance, the German "model" of municipal multi-utility companies, or even the pattern of a national company centralizing the provision of WSS services that prevailed in most Latin-American and African countries from the early 1930s to the late 1970s.

[14] The path dependence concept refers to the idea that present tecnological or institutional choices are conditionned by the remaining effects of deep-rooted technological or institutional choices made in the past.

> "[the] success of any system of regulation depends on how well it is adapted to a country's preexisting institutions. If a country doesn't have the necessary institutions or imposes a regulatory apparatus that is incompatible with its institutional environment, its privatisation efforts may end in frustration, recrimination and emerging demands for returning to public provision" (Levy and Spiller, 1994, cited in Farina et. al., 1997: 61, free translation).

We may conclude that the design of appropriate policies for WSS services management and regulation must always be adapted to the intitutional environment of each country and consider the mobilization (or the resistence) of its social capital forces. Promoting PSP policies without observing such precept will probably result in unsuccessful experiences.

Methodology and analytical framework

In this section we explain the methodology of this report's comparative analysis, describing the main sources of data and information we have assessed, the techniques of research we have employed, as well as the analytical framework which guided our reflections. We also explain why we had to limit our analysis to some selected countries from PRINWASS studies, justifying our choices by some analytical and practical strategic criteria.

Context and inter-comparison

In cross-comparative research, two general theories are relevant: "structuralism" and "culturalism" (Gauthier, 2002). While the structuralist theory suggests that similarities are to be expected across countries sharing similar "structures", the culturalist theory instead suggests that cross-national dissimilarities are to be expected as a result of intrinsic country-specific characteristics. Obviously, we may combine both approaches to interpret or explain specific similarities or dissimilarities we observe in particular comparable issues.

The broad analytical strategies in cross-comparative research can be categorised in three levels: 1) aggregate level, 2) individual level, and 3) multilevel (Gauthier, 2002). Aggregate level indicators aim at comparing similarities and dissimilarities among countries in terms of specific macro-level characteristics and multivariate analyses of relationships between macro characteristics. Individual level strategies aim at describing cross-national similarities or dissimilarities, generalising results cross-nationally by testing whether results obtained in one country can be replicated in other countries, or testing a general model by pooling data from various countries. Multilevel analysis is an attempt at integrating micro- and macro-level variables and at recognising the possible role of different levels of determinants on individual outcome or behaviour (Gauthier,

2002). All those levels are involved in some ways in this report, in accordance with our analytical needs.

Methodological strategies and choices

Policy and institutional issues in WSS services sector are basically much based on the specific local conditions. Thus, generalisations and too direct comparisons have to be avoided. In this report, we do not attempt to make an exact comparison of prevailing institutional frameworks between the participating countries and case study utilities, but rather an overview of the diversity of arrangements and their reflections regarding private sector involvement and its trends.

While we recognise that policy, institutional, legal and regulatory frameworks mainly are dealt with at the national level, in some of our case study countries there may be rather big variations also regionally. This applies especially to federal states such as Argentina, Brazil and Mexico.

Instead of emphasising institutional differences between various countries or cases, this report aims more at describing some indicative trends in the evolvement of policies, institutions and regulations over time in regards to private sector roles.

Our comparative analysis of water sector trends regarding policy, institutional and regulatory issues is **primarily** based on data and information directly provided by six PRINWASS case studies reports related to the five selected countries we decided to work with,[15] whose respective methodology, although subject to variations related to specific local limits or constraints (available data, researcher's knowledge specialisation) is quite similar anyway: in all cases, it deals with the collection and systematic analysis of qualitative and quantitative data, documents, and strategic information –including interviews with stakeholders– about local PSP experiences on WSS; in all of them the analysis is focused on the impacts different forms of PSP may have on services' economic, social and environmental sustainability, as well as on their political dimension concerning regulation and democratic accountability issues.

However, we may recognise that those different dimensions were not equally covered in all case studies, for varying reasons which range from unavailability or lack of access to consistent and updated data (which stakeholders often refused to disclose) to limitations regarding the specialized knowledge area of each PRINWASS partner local research team: for instance, it would be excessive to expect a deep political and institutional analysis of a certain case study report whose research team did not have any social scientist among its members, as much as to expect a deep analysis of the impact of a certain PSP arrangement on services technological development for a case study whose team did not count upon any researcher from the engineering field.[16]

In fact, this problem was foreseen in our project planning, and at least part of those information gaps was supposed to be filled by all PRINWASS's partners during

[15] The respective case studies reports are: Azpiazu, 2003, Crenzel, 2003, Vargas, 2003, Castro, 2003, Seppälä, 2003, and Nyanchaga, 2003.

[16] Some partners also miss economists to develop deeper economic/financial analysis of their case studies.

the elaboration of the six already mentioned thematic CCRs. All CCR's coordinators were charged to ask each other for complementary and clarifying information about any issue regarding those thematic areas. In our case, we needed to have more information about water sector trends on policy, institutional and regulatory issues concerning mostly the **national level**, which was superficially treated in most case studies reports which were mainly focused on local and regional levels. So, in the beginning of this research period, we sent to all of our partners some guidelines and a small questionnaire requiring additional information about how such issues were treated in each country at the national level. But, as the work of all partners during this phase was hardly affected by the long delay taken by the European Commission to release the funds concerning the project's second year, we were not able to get complete answers from all partners in time. So, some important gaps on specific issues still remained and will probably last until the end of the project. These are the practical reasons that impelled us to work with some selected countries, instead of trying to produce a comparative analysis covering all the case studies, although we may eventually add to our comparative analysis some illustrative information from other case studies that don't make part of our "sample".

To select the countries whose water sector trends should be analysed and compared in the present CCR, we decided to combine practical and analytical criteria. For the practical ones, it would be convenient to select countries to which this report's coordinators were more closely acquainted with, especially at the national level. At the same time, for analytical and comparative reasons, it would be important to select countries from both developing and developed regions, which presented special interest for the discussion of policy, institutional and regulatory issues regarding water sector. It means that the selection should cover a diversified set of forms of private involvement in WSS services, showing different stages of development and contrasting outcomes. The combination of all those criteria guided our choice to include the aforementioned countries. Anyway, their specific interest for our comparative purposes may only be understood after knowing the analytical framework proposed for this study below.

Analytical Framework

As its first analytical step, focused mostly on the national level, this report seeks to give an overall description of the following elements for each country studied: i) the main features of the most important laws regulating WSS and related issues (especially water resources, environmental, public health and urban development policies); ii) the ways in which this sector is organised in terms of institutional framework and market structure (what are the respective attributions of each government level with regard to services provision and regulation; what is the respective weight of private and/or public operators and the role of different government levels in WSS services provision, etc.); iii) the most important NGO's acting on WSS sector's political arena and which role do they play (if any) in the National WSS policy. These descriptive elements are the basis for our comparative analysis, which will be unfolded into some strategic dimensions.

We may say that five axes or dimensions of WSS Legal and Institutional Framework need to be analysed, especially the changes they may be going through, mostly at the national level (but also at the local level for some case studies):

1. **The relationship between the public and the private sector**: We need to know what is the entire array of PSP options legally authorised and effectively implemented in each country (franchising of operating and management functions, concession and leasing contracts, full divestiture, etc);
2. **The relationship between local and central governments**: We are interested to know how the degree of centralisation/decentralisation of WSS management may influence and be influenced by PSP in each country.[17] This dimension must be related to the political system of each country: for instance, in Federal States such as Brazil, Mexico and Argentina it is usually the Federal Constitution that regulates the share of competences and attributions between each government level in specific fields, which may include sanitation (as in Brazil);
3. **The relationship public authority – private operator**: It deals with the legal requirements concerning the public authority's inalienable rights and obligations towards public services delegated to private sector as their granting or conceding power, as well as the rights and obligations t be assumed by private operators;
4. **The relationship private operator – regulator**: This dimension is only pertinent for the countries which have specialised regulatory entities for WSS services. We need to know the role and the scope of such entities, as well as the legal and effective powers they have to regulate the private or public operator's performance;
5. **The relationship between operator and users**: This dimension deals with the degree of accountability of private operator not to the regulator or to the public authority (grantor), but rather directly to the users themselves, which may be organised in formal consultative bodies recognised by the operator or be informally involved on the operator's participatory strategies to provide services to poor communities. It may also involve the country's consumers' rights legislation.

The five selected countries present very diversified features with respect to such axes, what may allow interesting comparisons regarding how each country may build (or not) a peculiar national WSS services management policy, which may be more or less "native" or "imported" and acclimated to some degree, according with the way it deals with the issues placed under those axes. We may consider yet the possibility of a country not having any national policy corresponding to a strategic vision for the water sector, although it may be passing through important institutional changes.

[17] In the UK, e.g., the privatisation of WSS services which took place in 1989 was preceded by a centralisation move which created in 1974 ten Regional Water Authorities which were privatised afterwards, while in Argentina the privatisation of this sector in 1993 followed a previous decentralisation move of the former national company Obras Sanitárias de la Nación (OSN), which was divided into provincial companies in 1980.

Water sector's policy and regulation trends: describing and comparing selected case studies

This section is divided into two parts respectively dedicated to describe and compare water sector's policy and regulation trends in the countries we have selected to study. However, before giving a brief description of each country's intitutional framework for WSS services (mainly the policy and legal environment, the public and private organisations involved), it is worth to have a general overview of our "sample" main features, stressing their most important similarities and dissimilarities, which may be observed in Table Nº 3, on the next page.

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Table Nº 3. Main sociological features of the selected countries

Selected Countries	Main Sociological Features			
	Political	**Geo-demographic**	**Economic**	**Social**
U.K. (England and Wales Wales)	Unitary State highly centralised, member of the European Union; Parliamentary government based in an old and stable democracy	Highly urbanized country, with medium size population (56 million inhabitants) slightly concentrated in the capital and some medium size cities	Highly industrialized developed country and most important financial market of Europe	High level of HDI* (0.930), ranking 13 in the world and 9 in Europe
FINLAND	Unitary State with a quite decentralized administration, member of the EU; Parliamentary government based in a stable democracy	Small population (5 million inhabitants) living mostly in urban areas (60%) in small and medium size cities	Industrialized and developed country whose economy is highly based on forestry resources	High level HDI (0.930), ranking 14 in the world and 10 in Europe
ARGENTINA	Federal State, with highly centralized administration; Presidential government; democracy restablished since 1983 within an instable political and institutl. environt.	Highly urbanized country, with medium size population (36 million inhabitants) strongly concentrated in the great B. Aires agglomeration	Developing industrialized country whose economy is based mostly in agro-industrial production; high level of external indebtedness and financial dependance from external capital	Medium level HDI 0.849), ranking 34 in the world and 1 in Latin America. It is recovering from a very strong political and economic crisis which increased significantly its poverty levels
BRAZIL	Federal state, with a quite decentralized administration; Presidential government; stable democracy since 1985	Highly urbanized country, with a big size population (170 million inhabts) slightly concentrated in metropolitan areas and medium size cities	Developing industrialized country with a diversified economy in which agro-industrial sector plays a central and increasing role in its exports; high level of external indebtedness and financial dependance from external capital	Medium level HDI (0.777), ranking 65 in the world and 7 in Latin America. High regional and social inequalities place it as one of the most unequal countries in the world
KENYA	Unitary state, with a quite centralized administration; presidential government; multi-party democracy since 1992	Medium size population (almost 30 million inhabitants) concentrated in rural areas	Limited industrial activities; economy based in cattle raising/subsistence agriculture; low level of exports (mostly coffee and tea); increasing importance of tourism; strong dependance from external support (technical and financial)	Low level HDI (0.489), ranking 146 in the world and 14 in Africa; important etnic conflicts and social inequalities

Source: United Nations Development Program, Development Report 2003. *HDI levels refer to the year 2001.

At first sight, the table above shows us how difficult it may be the challenge of comparing five countries so diverse in terms of their respective political institutions, geographical and socio-economic features, suggesting the need to emphasize the culturalist approach. But, on the other hand, it also shows some common features that approximate or separate specific countries according to structural aspects: UK and Finland as developed, urbanized and industrialized countries from the European Community; Argentina and Brasil as highly urbanized and industrialized developing countries from Latin America, whose economies (increasingly integrated) face the same problems of economic dependance from external capital to finance public debt and ensure monetary stability; and Kenya, as a low income agrarian country from Africa whose development depends much more on financial and technical cooperation from multilateral donors and ESAs. So, we need take into consideration both the structural and cultural similarities and dissimilarities shown in this general overview of those five countries in our efforts to describe and compare their respective WSS services policies.

Starting by the descriptive aspects, we present hereafter the institutional, legal and regulatory framework of WSS services in each country, following the order in which their appear in Table Nº 3.

Descriptive elements of WSS services management policy in the studied countries: institutional and regulatory framework

What we present below is just a general overview of each country's WSS services institutional and regulatory framework, which involves its respective related policies, legislation and organisations. For each country, we try to give only the essential information covering the dimensions proposed in our previous analytical framework, while more detailed information may be given in synoptical charts placed in the Appendices.

A) England and Wales

This case of WSS services privatisation involving full assets divestiture represents an unique experience in the world in such a scale, where public powers were completly left out from operational activities in this field, while the regulatory powers of the central State were considerably strengthen at the same time.

Policy and Institutional Environment

The legal and institutional framework in the UK can be rather easily altered by the Parliament. This is largely due to the UK's historical lack of a written constitution, a well-defined separation of powers, and a meaningfully bicameral legislature. The lack of a constitutionally-defined role for local and regional government in particular has made it easy for successive central governments to exercise a lot of power over municipalities. The nature of the UK's political system has also made possible, in the last thirty years,

two radical restructurings of the water sector in England and Wales (different arrangements apply in Scotland and Northern Ireland).

The first of these occurred in 1974, when Regional Water Authorities (RWAs) were created, based on principles of river basin management, through merger of existing municipal companies. The reorganization created ten Regional Water Authorities (RWAs) in England and Wales. The RWAs replaced 29 river authorities, 160 water supply undertakings, and about 1300 sewage treatment and disposal units. This completed the process of rationalisation in the water supply sector, where between 1945 and 1967 the number of undertakings, both public and private, had been reduced from 1045 to 192 (contrastingly, in the sector of wastewater disposal there was no reduction in the number of units until the 1974 reshuffling). The RWAs had a majority of its members appointed by local authorities, while the Secretary of State for the Environment appointed the chairmen and the Ministry of Agriculture, Fisheries and Food also had some representatives. The 1983 Water Act cancelled the role of local authorities in the boards of the RWAs, and all its members became appointed by either the Secretary of State for the Environment or the Secretary for Wales (in the case of the Welsh Water) or the Minister for Agriculture, Fisheries and Food.

The present organisational setting of the water sector in England and Wales was introduced in 1989, with the privatisation of the existing ten Regional Water Authorities (RWAs) in charge of water supply and sewerage. This organisational framework was the product of successive institutional and political rearrangements that took place since the early 1970s, especially the radical reorganisation carried out in 1974 aimed at rationalising and centralising a highly disintegrated public utility sector which had been developed over a very long period of time.

With privatisation, all functions related to water supply and sewerage were transferred to ten Water Services Companies (or Water and Sewerage Companies – WaSC), which replaced the RWAs starting on 1 September 1989. Other duties previously in the hands of the RWAs, like pollution control, water resources management, fisheries, flood protection and alleviation and land drainage were entrusted to a newly created public body, the National Rivers Authority (NRA). The only exception were 29 Statutory Water Companies, which had survived the 1974 reorganisation and now were also allowed to continue with some changes to their status as Water only Companies (WoCs). The WaSCs were set up as the principal operating subsidiaries of the ten Water Holding Companies, the companies established under the 1989 Companies Act.

As a result of these developments, the major aspects of the present legal and regulatory framework relate to (a) competition; (b) consumers' rights; and (c) environmental care, as we describe below.

Regulatory Framework

The 1989 privatization brought about a substantial strengthening of public sector regulation of the water industry. This was mainly due to the fact that privatization did not introduce competition "in the market", as the former public monopolies were simply replaced by private monopolies and this created the need for increased regulation.

Water services quality regulation:

It involves basically i) the quality of the product drinking water and ii) the quality of the supplying service; but we may consider that it encompasses as well those regulations concerning iii) the consumer rights (and duties) of WSS services' users.

i. Drinking water quality: The regulator for drinking water quality, Drinking Water Inspectorate (DWI), was created in 1990 and its main task is to check the compliance of the water supply undertakers with the relevant quality standards. DWI is part of DEFRA, the Department of Environment, Food and Rural Affairs. Since 1990, DWI is responsible for assessing the quality of drinking water in England and Wales, taking enforcement action if standards are not being met, and appropriate action when water is unfit for human consumption. Its main job is to check that the water companies in supply water that is safe to drink and meets the standards set in the Water Quality Regulations. It also investigates complaints from consumers and incidents which affect or could affect drinking water quality. Its investigations of incidents can lead to water companies being prosecuted. The Water Act of 2003 gave new powers for Health Authorities to force water companies to fluoridate their water supply.
ii. Service quality standards: Besides its functions as the economic regulator of the private water industry from England and Wales Wales, the Office of Water Services (OFWAT), created in 1989, has the primary duty of ensuring the proper functioning of the services, which includes securing the financial viability of the private undertakers. Being also empowered to foster market and comparative competition (see below), OFWAT is responsible for setting and monitoring WSS services' quality, and has to deal as well with disputes between the companies and customers. Under the 2003 Water Act, OFWAT has new powers to fine water companies up to 10 % of their turnover in cases of severe breaches of customer service standards, legal obligations, or license conditions. The new provisions, expected to take effect in 2005, bring OFWAT's powers into line with those already operated by other regulators.
iii. Consumer rights and participation: Under the Water Industry Act 1999, water companies were impeded to disconnect consumers for non-payment. Pre-payment meters were also outlawed. Earlier regional Customer Service Committees (CSC), organised to represent consumer rights, have developed into new representative bodies: the earlier OFWAT National Customer Council is presently called WaterVoice Council and earlier CSCs as WaterVoice Committees. Water Act 2003 set up a Customer Council for Water (CCW) replacing WaterVoice, but the change will not come into effect until October 2005. CCW is expected to be closer to the model employed in other network industries.

Economic regulation

Economic regulation of the water companies in England and Wales is carried out by the Director General of Water Services through his Office of Water Services (OFWAT), whose main attributions in this field are to protect the interest of customers regarding fairness in the pricing of the services, promoting economy and efficiency on the part of the undertakers, and facilitate competition between suppliers. Other two regulatory bodies, the Monopolies and Merges Commission (MMC), and the Office of Fair Trading (OFT) have also important functions in relation to the water sector. The MMC plays the role of a sort of court of appeal for OFWAT's Director General and for the water companies regarding, e.g., pricing control policies. Also, any proposed mergers between companies holding assets in excess of £30 million each are referred directly to the MMC. Regarding the OFT, this body has a complementary supervisory function of actions that may affect customers of the water and sewerage undertakers.

Regulation of ownership and competition

WSS assets ownership in England and Wales is with (a) privatised Water and Sewerage Companies (WaSCs) and Water Only Companies (WoCs). The 10 WaSCs were first protected from takeover for 5 years by the government's 'golden share', but later half of the WaSCs have been taken over, although no mergers between them have been permitted. Takeovers in the 1990s were dominated by the French multinationals and energy companies.

The Water Industry Act (1991) describes four main ways to achieve competition: (1) inset appointments– small-scale changes to monopoly areas, whereby the existing supplier is replaced by another, for a specific site of a user of more than 100 megalitres of water per year; (2) cross-border supplies - where customers can get connections from another company, but must finance the cost of that connection; (3) unregulated supplies – a few exist and consumers can buy supplies from them; and (4) common carriage - when one service provider shares the use of another's assets, such as its pipe network or treatment works. The 2003 Water Act increased the scope for this, bringing provisions for common carriage from autumn 2005. Customers using more than 50 megalitres a year are to have the option of switching to another supplier, with the service possibly being provided over the existing network. Previously, new suppliers had to build new infrastructure (pipes or boreholes) to supply the new customer.

Environmental regulation

At privatisation, environmental regulation was entrusted to the National Rivers Authority (NRA), which in 1995 was replaced by the Environment Agency. The Agency was created by amalgamating the NRA, Her Majesty's Inspectorate of Pollution, 83 Waste Regulation Authorities, and parts of the Department of the Environment. The Environment Agency has the duty to conserve, augment, redistribute and secure the proper use of water resources in England and Wales. It is the central body with responsibility for long-term water resources planning there. The Environmental Agency licenses the impoundment and abstraction of water under the Water Resources Act 1991.

This agency is also responsible for maintaining or improving the quality of fresh, marine, surface and underground waters in England and Wales.

The environmental regulation has been dominated by European Union legislation and directives. But there are important measures taken at national level, as the introduction of a new system of water abstraction licensing created under the 2003 Act, which is linked to local water resource availability. The abstraction licensing scheme shifts from one based on purpose of use to one based on volume consumed. Licences will be time-limited, and the Environment Agency may revoke it without compensation if they have not been used for four years.

Strategic Planning authorities and local authorities have also an important role in environmental regulation as entities responsible for the land use planning and decisions. Local authorities also regulate the quality of private drinking water supplies through their environmental health duties.

Recent trends and expected changes in regulation

Water Act 2003 changed OFWAT's structure, replacing a single Director General of Water Services with a new regulatory authority (Water Services Regulatory Authority) with a board structure. The new body will not come into existence too soon, to allow OFWAT time to complete its price review work undisturbed. Envisaged time of implementing the new structure is April 2006.

B) Finland

This country represents a case where PSP in WSS services is basically limited to outsourcing non core actitivities and to increasing incorporation of municipal utilities, which plays the central role in this field.

Policy and Institutional Environment

In Finland local authorities provide about two thirds of all public services and the State (the central government) about one third. The model for providing basic services is built on the responsibility and autonomy of the local governments. The municipalities have a constitutional autonomy and the possibility to design their administration and service production according to what their democratically elected government considers to be best. At the same time they have statutory obligations to provide basic services in health care, social services and education for their population. Over the years the municipalities have been the owners of the water and sewerage works, and their own organizations have also been operators of the works. Yet, Finnish water and sewerage works can be classified into three main categories based on the organisational and functional model:

1. Small private water associations serving countryside communities and sparsely populated areas within municipalities;
2. Municipal utilities serving urban and rural centres;
3. Supramunicipal (intermunicipal and regional) utilities

In 2001 the total number of the two first categories including those serving more than 50 people was some 1970. The small systems, water associations can be partnerships, water cooperatives, or joint-stock companies owned mainly by municipalities. There were about 1 000 associations in 1988 and the number has increased in dispersed rural areas. The number of municipal water utilities in 1998 was about 500 and some 460 in 2001, slightly over the total number of municipalities (446). In 1993 there were about 20 supramunicipal water or sewerage systems rising to 30 by 2001. The small water associations, mainly cooperatives, usually provide water supply services, whereas sewerage services are provided by municipal utilities.

The Finnish water and sewerage works have outsourced to the private sector by large the delivery of the goods and services. About 40-80 percent of the expenditure with regard to operations and maintenance is used to procure the goods and services from the private companies based on the competitive bidding, and nearly 100 percent of the expenditure with the regard to capital investment projects is going to the private companies based on the competitive bidding.

The national level policies and legislation related to water services in Finland are aimed at safeguarding the well-functioning water and sewerage undertakings, and at improving the institutional framework and preconditions for their operations. Water services are considered commodities which are beneficial to the public or common interest, and therefore their availability must be guaranteed in all circumstances by legislation. The goal is that the water services availability and quality, or the reasonability and equitability of charges cannot depend on the ownership and management model of the water and sewerage undertakings. The formulation of the Finnish policies and legislation are based on the EU policy and strategies. They form the "enabling institutional framework", i.e.: they consider all forms of ownership and organisational models for operational management of water and sewerage undertakings on an equal basis.

Besides governmental authorities from all levels, other key actors in the water services policy making are the Finnish Water and Waste Water Works Association (FIWA) and the Association of Finnish Local and Regional Authorities (AFLRA).

Regulatory Framework

The Finnish regulations and laws related to water and sewerage services can be categorised into four main groups: (1) water services legislation, (2) health protection legislation, (3) water and environmental protection legislation, and (4) other related legislation. These are effected through the European Union directives and national legislation, whose enforcement is in charge of many public organs and some independent

authorities acting at different levels under overall cooperative and coordinated strategies.[18]

Water services quality regulation

It comprises i) the quality of drinking water and ii) the quality of the supplying service, encompassing as well iii) the regulations regarding consumer rights.

i. Drinking water quality: The quality of drinking water services is regulated by the EU Drinking Water Directive and the national Health Protection Act (763/1994) and supervised by the regional and municipal health authorities. The local authorities monitor regularly the quality of drinking water and report the results to the regional health authorities. Municipal health protection authorities are responsible for taking care of the quality surveillance of drinking water. The monitoring results of water suppliers distributing at least 1 000 m3 water per day or serving at least 5 000 consumers are submitted to the Provincial State Office and further to the National Public Health Institute. By virtue of the Health Protection Act, municipal health protection authorities can give instructions on the treatment and use of drinking water to prevent harmful health effects. Since 1997, municipal health protection authorities are obliged to report all suspected waterborne outsbreaks to the National Public Health Institute, which then gives expert help when needed in solving the outbreak. In 2000 a new Act on the quality standards and inspection of domestic (drinking) water was brought into force by the Ministry of Social Affairs and Health, based on EU directive (98/83/EU). It supersedes earlier statutes on the quality of domestic water and its monitoring as spelled out in the Health Protection Act. The Act requires that water and sewerage works and health protection authorities provide more information. The quality of treated and disposed wastewater is regulated by several EU directives and national laws discussed below under the topic "environmental regulation".
ii. Service quality standards: The new Water Services Act (119/2001), which is based on the EU Water Framework Directive (2000/60/EC), contains provisions on the development of the water services as well as organisation of water services and rates. The Act supersedes the laws on the Act on Public Water and Sewerage Systems and the Act on Wastewater Rates. The Water and Sewerage Services Act also incorporates provisions on the minimum standard of consumer protection and clarifies the liabilities of the municipality. It sets a general obligation to the municipalities for the provision, i.e. overall development and organising of water and sewerage services aimed at supplying a sufficient amount of domestic water of a good hygienic standard at a reasonable cost as well as proper sanitation from the viewpoint of environmental protection. The Water Services Act is applied to all water and sewerage undertakings, which are taking care of the water services management of a community regardless of the ownership or management model. Thus, it treats public and private operators equally, and enables the production of

[18] For details, see Figure Nº 4, on Appendix 1.

water services to be carried out either by public or private organisations. The Water Services Act does not stipulate in details the roles and responsibilities of the different regulatory authorities (the Regional Environment Centre, the municipal health protection authority and the municipal environmental protection authority). The Consumer Ombudsman, however, will control the compliance with the law of the general supply conditions in respect of consumer protection.

iii. Consumer rights and participation: The Consumer Agency and Consumer Ombudsman function in the administrative sector of the Ministry of Trade and Industry. The task of the Consumer Agency and Consumer Ombudsman is to ensure consumers' economic, health and judicial position and to implement consumer policy, and to improve consumer's chances of participating in public decision making and the markets. The Director General of the Consumer Agency serves as the Consumer Ombudsman. She/he monitors compliance with legislation concerning the protection of consumers' rights. The Consumer Ombudsman controls the compliance with the law of the general supply conditions for water services (water, wastewater, storm water and drainage) in respect of consumer protection.

The Constitution of Finland stipulates that the powers of the State in Finland are vested in the people, who are represented by the Parliament. At the local level, the municipal council has to take care that the inhabitants and the users of the services have the possibilities to participate in and influence the activities of the municipality. There are several ways how citizen participation in municipalities can be enhanced. In practice, many municipal water and sewerage undertakings have actively advocated the inhabitants living outside the water services area of the water and sewerage undertakings, how to establish and organise water services associations, their management, and given advice about the planning, construction and operations and maintenance of the undertakings.

Economic regulation

In Finland there is not yet any "active" economic regulatory system for water services. The municipal council makes decisions concerning the general bases for charges for municipal and other services. On the other hand, in accordance with the Water Services Act, charges set by water undertakings shall permit full recovery of all the investments and operating costs, being allowed to include only a reasonable rate of return on capital investments.[19] Yet, the subsidies for water services from the municipality, the State and the EU are still possible in accordance with the Water Act (on the basis of the EU Water Framework Directive). As a part of its duties, the Finnish Competition Authority (FCA), subordinated to the Ministry of Trade and Industry, follows up WSS services tariffs and reacts on claims on inappropriate tariff setting.

[19] So far, there is no exact definition for the term "reasonable rate of return".

Regulation of ownership and competition

Water Services Act and other legislation do not as such restrict the type of ownership of water undertakings or assets. Furthermore, the owner of the water and sewerage undertaking (which currently means mostly the municipalities) can choose freely how the ownership and management of the operations will be organised.[20] However, the water and sewerage undertakings may also be considered monopolies. If they are not prohibited as such in the European Union, the abuse of market dominance or monopoly position is certainly forbiden. Aiming at preventing such abuse, the Finnish Competition Authority (FCA), under the Ministry of Trade and Industry, has a task to protect sound and effective economic competition and to increase economic efficiency by promoting competition and abolishing competition restraints. The FCA also investigates major restrictive practices, which are harmful to fair economic competition. Furthermore, the FCA promotes competition by making initiatives to adjust the rules, regulations and administrative orders that hinder the functioning of markets and issues statements about draft bills involving the economy.

Environmental regulation

It involves i) water resources management policies and strategies, and ii) other related environmental issues.

i. Water resources management: At the central level, water resources management is the responsibility of the Ministry of Agriculture and Forestry and the Ministry of the Environment. These ministries are in charge of water and environmental policy and strategy development, and legislation. Under these ministries the Finnish Environment Institute (FEI) operates as a national advisory body. At the regional level, water and sewerage undertakings are regulated and monitored by thirteen Regional Environment Centres (REC), which also are responsible for regional planning, monitoring and guidance in water issues within their area.[21] The REC also oversee the implementation of the national policy and strategy in water services sector. In issues related to general administration and water protection due to waste water disposal, those centres and FEI are responsible to the Ministry of the Environment, but in issues related to water resource management and water services they are responsible to the Ministry of

[20] Basically, the owners as well as the operators of the utility's core activities, which are not public authorities, but service producers whose operations and charging has to be based on the Water Act, may be both municipal organisations, private associations, and privately/publicly owned joint-stock companies.

[21] The responsibilities of the REC cover water and sewerage services, flood prevention, drainage and irrigation, restoration of watercourses used for timber-floating, multipurpose regulation of river systems, environmental permits of regional significance, permit holders' obligations, maintenance of hydraulic structures, dam safety, combating sudden flood and ice jams, ditching procedures, investment activities for integrated water resources management and other water resources management issues.

Agriculture and Forestry. Finally, at local level, the water and sewerage undertakings are monitored and controlled by the municipal health protection and environment protection authorities. As concerns water resources policies, Finland has adopted two important initiatives in recent years: the country's third programme of targets for water protection (Water Protection Targets for 2005), approved by the Council of State in 1998; and the Water Resources Management Strategy, approved in 1999. Finland's third programme of targets for water protection sets out the relevant guidelines for planners, policy-makers and those monitoring water protection schemes up to 2005. The programme stipulates that the Ministry of the Environment together with the representatives of various sectors must prepare a programme of action, incorporating the details of jointly agreed measures and action to be taken on water protection in general and on specific pollutants, in order to meet the targets set. The Water Resources Management Strategy (WRMS) was prepared by the Ministry of Agriculture and Forestry in collaboration with the Ministry for the Environment, the Ministry of Social Affairs and Health, the Finnish Environment Institute and the Regional Environment Centres. The WRMS aims at implementing the Strategy for the Sustainable Use of Renewable Natural Resources approved in 1997. Covering the water services of the municipalities and the use and management of water courses, the WRMS guides the management of water resources in the administrative sector of the Ministry of Agriculture and Forestry. Such strategy stipulates the key actions in accordance with which the objectives are set and can be met through Management by Results. The vision and objectives are defined in 2010. The overall objective of the WRMS is that the use of water resources is socially, economically and ecologically sustainable. In regards to water resources legislation, Finland's most important law, the Water Act (n. 264), was passed in 1961 and has been revised several times thereafter. The act aims to control strictly altering and damming of water bodies. Any activities likely to damage water bodies are subject to permit. Applications for permits are processed individually and permits are granted on terms laid down separately case by case. The Water Act is currently amended, and the draft is expected to be ready by the end of the year 2004. The rules and regulations concerning the water resources pollution prevention have already been transferred to the Environmental Protection Act (86/2000). The Ministry of Justice established a committee on 22 March 2000, the task of which was to assess the required changes in water legislation, and make proposals for the amendments in the Water Act (264/1961). Among other main issues the changes will consider the latest international water legislation principles and the latest European Union legislation and policy instruments.

ii. Other environmental issues: In March 2000 a new Environmental Protection Act (86/2000) came into force harmonizing and consolidating the laws protecting the environment. The legislative reform changed 24 laws and compiled separate statutes into a general law which governs activities which pollute soil, waters and air. The new Environment Protection Act replaced the Air Protection, the Noise Abatement and the Environmental Procedure Acts. The Environmental Protection Act implements the European Union directive on Integrated Pollution Prevention and Control (IPPC), which obliges EU member states to integrate the control of

emissions caused by industry. The stipulations on environmental protection are now combined in the Environmental Protection Act. It is a general act on the prevention of pollution, which is applied to all activities that cause or may cause environmental damage. Municipalities are obliged to chart the need for protection of waters and the environment. They issue environmental protection orders for the construction and maintenance of waste water systems.

Recent trends and expected changes in regulation

In addition to the recent changes included in the Water Services Act (2001), there has been discussion in Finland whether a more comprehensive economic regulatory system should be established. If public-private partnerships are increasing or private operators start getting considerably more operational management contracts, and the capacity and competencies of the Competition Authority would be found inadequate, there might be a need to establish a specific regulatory agency for water services. Through increased claims for greater efficiency and overall public sector reforms – within the European Union context – there may become more pressure towards opening the public services production for competition.

C) Argentina

In the early 1990s, this industrialized developing country has been the scenery of the most important PSP operations regarding WSS services in the world, which involved big scope concession contrats granted mainly by national and provincial authorities to the world's leading companies in this field. Ten years after, considering the important increase on tariffs, the conflicts raised and the reduced outcomes related to coverage expansion, which remained far below the contractual goals established for this period, as well as some contracts prematurely terminated, we may say that Argentina's experience in this field represents an evident case of PSP failure whose causes must be well understood.

Policy and institutional environment

The private concession of most WSS services regarding urban areas in Argentina was part of a broad and accelerated privatisation policy carried out by President Menem's administration during the 1990s, as a response to an acute economic crisis related to hiperinflation and the country's public finance collapse. According to Crenzel (2003), within only three years "telecommunications, oil, the state airline, electricity, gas, ports, petro-chemical industries, sectors of military defence, steel industries, trade navy, water and sanitation and most public utilities in charge of the provincial government were privatised" (p. 25). As a consequence of such policy, which was institutionalised through extraordinary Decrees issued by the National Executive Power, having been followed by many provincial governments, the whole sector of water utilities in Argentina became highly dominated by private operators, most of them under control of transnational groups: by 1999, according to data from the National Body of Hydraulic and Sanitation

Works (ENOHSA), 60% of the country's population were supplied by private companies, against 30% supplied by the public sector, while the remaining 10% were served by cooperatives acting mostly at neighbourhood level (Azpiazu, 2003: 66).[22]

The country's most important operation, in economic and political terms, was the concession of the Greater Buenos Aires' WSS services, started in 1993, in which the National State plays the role of the conceding power or granting authority; the second one, may be considered the concession of such services by the Province of Tucuman, not properly for its scale, which is surely important, but rather by its political repercussions as big failure, as the contract was terminated by both parties – the concessionary and the provincial government – in late 1997, a little more than two year after having started. Our descriptive analysis of Argentina's policies oriented to promote the privatisaton of WSS services through large scale concessions is mostly focused on this two cases and essentially based on two specific PRINWASS Case Studies Reports (Azpiazu, 2003; Crenzel, 2003).

In the case of Greater Buenos Aires, where the privatisation was conducted by the National government, the WSS services of an area covering almost ten million people, which originally involved the Federal Capital (today "autonomous" City of Buenos Aires) and 13 municipalities of its metropolitain area, were conceded for a 30-yer period to Aguas Argentinas S.A., a joint stock private company leaded by the French group Suez Lyonnaise des Eaux, who won the international invitation to bid offering the lowest rate. The other municipalities from Greater Buenos Aires also privatised their respective services later on, between 1999 and January 2000. With the incorporation of some new municipalities and the break up of San Miguel into three new municipalities, the concession area of Aguas Argentinas comprises today 24 cities from the Province of Buenos Aires, besides the autonomous city of Buenos Aires.[23]

In Tucuman, the privatisation covered the unitary and the integral supply of WSS services to all of its 17 municipalities, whose population attained 1,3 million people in 2001 (around 80% of which living in urban areas of more than ten thousand inhabitants). The Province conceded such services to for a 30-year period to Aguas del Aconquija S.A., a joint stock company whose main shareholder and technical operator was the French group Compagnie Générale des Eaux (now called Vivendi). As it happened in Greater Buenos Aires, the bid was won by the bidder which offered the lowest rate, and the concessionary did not have to pay any kind of entry fee or rent for the use of public assets.

The present organisation of WSS services in Argentina, characterized not only by the predominance of private operators in terms of covered population with tap water, but

[22] But there are also some cases of cooperatives acting as services operators in many small cities, and even in a few medium-size ones (Gouvello, 1999). Later, with the withdrawal of Azurix Company as a concessionaire of the WSS services of some municipalites from the Province of Buenos Aires, and of the Aguas del Aconquija Company as the concessionaire of Tucuman's services, this relationship was modified. Anyway, at present the private sector participation is not inferior to 60% (idem, ibidem).

[23] The concession area of this company do not correspond exactly neither to the limits of the Province of Buenos Aires (where there are other private operators acting in other municipalities as well as a few municipalities which remain in charge of their own services), nor with the ones of Greater Buenos Aires (or Buenos Aires Metropolitain Area).

also by a very fragmented institutional framework where services may be provided either by local cooperatives, municipal, provincial or national operators, evolved from a previous situation where services management and provision were extremely centralized in hands of a national sanitation company, Obras Sanitarias de la Nación (OSN), created in 1912, which had monopolistic powers over such services in all the country's urban areas (Castro, 2002: 15-17). However, this centralized management model gave rise to the political use of the company, especially under peronist administrations, generating many inefficiency problems over time. After a frustrated attempt to privatise OSN in the late 1970s, the last military dictatorship decided to decentralize/ "provincialize" this company's services in 1980, when OSN's activity area was limited to the Federal Capital and 13 municipalities of Greater Buenos Aires, while in the rest of the country the provision of such services was made the responsibility of the respective provincial government, which became free to decide how to organize its own services management. So, OSN provincialisation gave rise to diversified management options for WSS services, including the creation of Provincial companies, the municipalisation of services management in some cities and the organisation of water and sewerage cooperatives acting mostly at local and neighbourhood levels.

According to Azpiazu, "the privatisation of publicly-owned companies [...] was the pivot around which the neo-liberal restructuring of Argentine capitalism revolved during the nineties" (Azpiazu, 2003: 53). As he stated, "against the background of a hyper-inflationary crisis, the government directed its privatisation policy to gaining corporate support, with a view to obtaining the transitory required means to sustain macroeconomic balance in the short term" (Azpiazu, 2003: 53).[24] Formally, the process started with the approval of the State Reform Law (n. 23696) and some economic emergency laws by the two major political parties – the Justicialist party and the Radical-Civic party –in mid 1989. The first law activated the privatisation of publicly-owned companies, establishing both the general procedures involved and their limitations. It delegated to National Executive, according to each case, the power to decide which company was to be privatized, when and how. Excepted the case of gas and electricity companies, whose privatisation was authorized by specific National laws, the other operations regarding the privatisation of (central) state owned companies (including OSN) were authorized by decrees and resolutions of the National Executive Power, under the framework of the State Reform Law. As per the economic emergency laws, they provided the National Executive with special powers to carry out the transfer in each specific case.

The whole process had ideological, technical and financial support from multilateral financial organisations as the World Bank and the IDB. According to the former, the main reasons for the privatisation of WSS services in Argentina were the State's inefficiency to supply these (and other) services and its lack of resources to tackle the accumulated and growing deficits.

[24] The hyper-inflationary crises was subdued in 1991 with the lauching of an economic stabilization plan by president Menem's administration, which was based on the system known as "currency board", according to which the Argentinean State could release new pesos (the national currency) only if it accumulated the same amount of American dollars. The system was based on the convertibility law, which remained in force from 1991 to 2002, by which one Argentine peso equaled to one US dollar.

According to Azpiazu, ten years after the concession was granted, Aguas Argentinas' failure to meet the investment objectives[25] "and the successive rate rises in real terms enabled the company's internalisation of extraordinary profits against a background of the institutional capture of the State in its various instances" (Azpiazu, 2003: 56). As he stated, such facts give "empirical evidence that suggests the failure of the privatisation process in terms of its own objectives, both as regards the service expansion towards the lower income sectors and as regards its growing inaccessibility" resulting from tariff increases (Azpiazu, 2003: 56).

The official decision to concede WSS services of Greater Buenos Aires through National Executive Power decrees:

> strengthened the company's power to redefine the initial commitments, conspired against the legal stability and predictability of the whole process and greatly affected the social costs involved in it: [...] the original contract could be re-formulated to include most of the concerns and proposals of the licensee, legitimised through various decrees and Resolutions, many of which were dubious in their legitimacy, endorsed under conditions of absolute discretionality, null transparency and no participation of the users and consumers (Azpiazu, 2003: 56).

Futhermore, in spite of many kinds of non-compliance to contract disposals incurred by the concessionary, "the administration of President Menem agreed to modify the original contract substantially, distorting its initial objectives to the detriment of users through successive renegotiations": for instance, "the rate system was altered with a view to minimising corporate risk through successive basic rate rises"; modifications were made in the scheme designed to finance service expansion with the introduction of various fixed charges into the rates; a new exchange risk insurance was created for the company in the event that the exchange parity was altered; the indexation of rates, fixed in local currency, according to the development of prices in the United States was established; and new price review instances were introduced inter alia (Azpiazu, 2003: 57). The subsequent administration, led by President De La Rúa, followed the same lax policy towards the regulation of such concession, ignoring the existence of original grounds for its termination.[26]

Among such non-compliances, the concessionary excessive external indebtedness –with respect to the maximum levels allowed in the contract and its regulations– took on dramatic relevance when, as of January 2002, the economic policy led by Senator Duhalde, which was then playing the role of the country's provisional

[25] The investments in expansion were far below the ones originally planned, while important works related to the treatment of sewage established in the original contract were not undertaken, what produced increasing levels of environmental deterioration (Azpiazu, 2003: 56).

[26] The concession contract to Aguas Argentinas S.A. established that the national executive power could terminate the contract unilaterally and with due authority if serious noncompliance with the legal and/or regulatory provisions was incurred, or if there were unjustified and repeated delays in the compliance with the agreed investments and aims (Azpiazu, 2003: 57).

president, triggered off a maxi-devaluation of the local currency and at the same time suppressed the application of the indexing mechanisms of the privatised companies' rate schemes, against the background of one of the most profound economic crisis in the history of Argentina. According to Azpiazu such facts made the private concessionary unsustainable in economic terms. And he added:

> there is no indication that the situation will improve, which not only questions the continuity of the license, but also the feasibility of the supply of the services themselves under adequate conditions, as is suggested by the loss of quality which was audited and penalised by the ETOSS [the regulator] with high fines through Resolutions 79/02, 80/02 and 81/02. […] Summing up, the development of the Aguas Argentinas S.A. license is characterised by high levels of non-compliance with the investment aims and their inherent modification; corporate inefficiency to capture and allocate resources derived from the unlimited level of external indebtedness, in a context of increasing exchange risk [...]; distributional inequality linked to an increasing incidence of the fixed charges in the final rate and the increase in the average residential rate by over 80% in real terms; the negative environmental impacts related to the imbalance between underground and superficial waters, among other factors, which resulted in wastewater flooding in most districts of the Buenos Aires conurbation; and the poor development of the initially agreed upon levels of sewer effluent treatment (Azpiazu, 2003: 57-58).

The failure of Tucuman's WSS services concession is still more evident, as the concession contract was terminated by a provincial decree in october 1997, only two years after having started. Meanwhile, the concessionary filed an application before the International Centre for Settlement of Investment Disputes (ICSID) to initiate an arbitration procedure against the Argentine Republic for 300 million US dollars, invoking the "Reciprocal Treaty of Investment Protection" endorsed by Argentina and France.[27] The main reason for this concession failure was the population's massive refusal to pay for the services, whose rates were increased in 106% immediately after the privatisation.[28] Such growing refusal, which were later reinforced after the problems that attained the quality of water in the province's capital, come to achieve 86% of users at

[27] This treaty was signed in 1991 between both countries and came into force on March 3, 1993. "At the time, Argentina also endorsed a series of similar treaties with other countries as a result of the increase in foreign investments due to the public enterprises' privatisation processes" (Crenzel, 2003: 6).

[28] Originally, the rates would be increased in 67%, but an additional rise was established on june 20th, 1995, by decree 1543-3, which created new charges: a 6% tax to finance the regulatory agency, a value-added tax (VAT) of 21% and a 12% charge concerning provincial and municipal taxes. This overall 106% rate rise greatly affected Tucuman's population, as it corresponded to 7% of its average monthly income ($500), 14% of the basic salary ($250), 22.4% of the basic family basket ($151.73 in April 1995), while services' cost exceeded the 3-5% interval of family income considered reasonable by the World Bank Crenzel, 2003: 25).

the peak of social protests (Crenzel, 2003: 29).[29] In such situation, the concessionary did not make the investments planed for the corresponding period, since it worked at a loss throughout the concession. With the concession contract terminated, the services were renationalized, now being in charge of the ENOHSA.

Regulatory Framework

According to Azpiazu,

> the huge concentration of power that the "emergency" situation invested in the government derived in weak regulatory frameworks and institutions for the monitoring of the economic and political power granted to private capital […]. In most cases, the privatisations were carried out through emergency Decrees issued by the national executive power without antimonopolistic and consumers' rights regulations, or specific regulating agencies. […] In addition, the government excluded all public consultation mechanisms from the agenda, and as a consequence, the civil society was not given a chance to participate in the debate about privatisations (Azpiazu, 2003: 53).

Water services quality regulation

It comprises i) the quality of drinking water and ii) the quality of the supplying service, encompassing as well iii) the regulations regarding consumer rights.

i. Drinking water quality: In the case of Greater Buenos Aires, the regulation of drinking water quality is part of the attributions of Ente Tripartito de Obras y Servicios Sanitarios – ETOSS (Tripartite Entity for Sanitary Works and Services), which is the regulatory body created in 1992 to regulate WSS services management and provision in this region, under this sector's privatisation process.[30] As regards the quality of drinking water, physicochemical and bacteriological parameters have been set in national legislation, as well as in the concession contracts, similar to those recommended by the World Health Organisation, which must be met by all operators. In the Greater Buenos Aires case, the private concessionary must guarantee the parameters are met by checking, through a systematic series of tests, the quality of the water the company is providing to users and the composition of effluents. ETOSS runs its own bacteriological and physicochemical tests of the quality of the water being

[29] In January 1996, during a stifling summer, water flowed out of taps with a turbid brown colour as a result of an increase in manganese in the reservoir of the "El Cadillal" dam, which caters for 60% of the water consumption in San Miguel de Tucumán. This situation lasted nearly a month, while the concessionary refused to recognize its responsibility in those facts that it considered "inexplicable" and due to "sabotage" (Crenzel, 2003: 29).

[30] For details about ETOSS institutional organisation and attributions, see "Economic Regulation" below.

supplied and of the quality of sewer effluents as well. With the help of the Sanitation Engineering Institute of the School of Engineering of the University of Buenos Aires, it also audits the tests made by Aguas Argentinas through contrastive tests, the control of the sampling methodology, the equipment and the technology used and the tests made. In the case of Tucuman, similar drinking water quality standards are applied, pursuant to national and provincial legislation. During the period in which the concession to the private company Aguas de Tucuman was in force, the application of drinking water quality standards were monitored and enforced by ERSACT (Ente Regulador del Servicio de Agua y Cloacas de Tucumán), the agency created by the law that autorized the privatisation of Tucuman's WSS services to regulate their management and adequate provision. The power of ERSACT was challenged by the private concessionary in the episode of manganese contamination of San Miguel de Tucuman's water supply, when the company did not cmply with the regulator's resolutions imposing discounts on tariffs related to the poor quality of the water distributed (Crenzel, 2003: 30).

ii. Service quality standards: In both cases, the concession contracts established quality standards for services provision (water supply regularity and pressure, services' coverture goals, delays regarding maintenance activities, etc.), whose control and monitoring was also attributed to the respective agency in charge of regulating each contract. But, in the case of Buenos Aires, some attributions originally in charge of the regulator (ETOSS), especially those related to economic regulation, were transfered in 1997 to the Bureau of Natural Resources and Sustainable Development (see below).

iii. Consumer rights and participation: According to article 43 of Argentina's National Constitution, as long as no other legal mechanism proves more suitable, any citizen may initiate a lawsuit against any act or omission from public or private authorities which might actually or imminently adversely affect, restrict, alter or threaten, with manifest arbitrariness and illegality, rights and guarantees recognised by the Constitution itself, a treaty or a law. If that were the case, the judge will have the power to declare the regulation on which the act or omission is based unconstitutional. The affected participant, the ombudsman and the associations devoted to defending collective interests, adequately registered and organised according to the demands and forms the law prescribes will have the power to initiate cautionary proceedings against any form of discrimination, or against any act or omission relative to the rights protecting the environment, economic competition, the users/consumers, or the rights with general collective incidence.

Besides, this constitutional disposition and other national legislation regarding the issue of consumer's rights,[31] the regulatory framework of most concession contracts contains specific dispositions concerning such matter. In the case of Greater Buenos Aires, the NEP Decree 999/92 establishes in its 42nd article that consumers and users of

[31] For instance, the Consumers Defence Law (24240).

goods and services have specific rights in their relations of consumption: to the protection of their health, security and economic interests; to suitable and truthful information; to freedom of choice; and to an equitable and deserving treatment. It is in charge of public authorities to watch over the protection of such rights, to promote consumers' education for consumption, to assure the defence of competition against all forms of market distortion (which includes the control of natural and legal monopolies); and to guarantee the quality and efficiency of public services under national competence, allowing for the necessary participation of consumer and user associations, as well as the the provinces involved in the control bodies.

Economic regulation

In both major concessions of WSS studied by PRINWASS in Argentina, the one regarding Greater Buenos Aires services, and the other involving services from urban areas of the province of Tucuman, economic regulation was one of the most important roles to be filled by the regulatory agencies created to support such privatisations.

In the case of Greater Buenos Aires, the design and application of the rules for economic regulation are primarly in charge of the Department of Water Resources under the Bureau of Public Works of the National Presidency, while their enforcement and monitoring is in charge of the ETOSS (Ente Tripartito de Obras y Servicios Sanitarios). It is a tripartite agency, created by Decree 999/92, in which intervene three political-administrative jurisdictions: the national government, the government of the Province of Buenos Aires, and the government of the autonomous city of Buenos Aires. The agency's board of directors is constituted by two representatives from each one of those parties. Although formally autonomous, ETOSS belongs to the Bureau of Public Works, and is in charge of regulating water and sewerage services in its jurisdiction, which includes the autonomous city of Buenos Aires as well as 16 municipalities from its Metropolitan Area. It involves regulating not only the concession to Aguas Argentinas S.A. but also other remaining operators (cooperatives for the supply of drinking water and sanitation, among others) acting within its jurisdiction. ETOSS is financed by a 2.6% fixed rate on each bill paid by the users.

However, the economic regulation of the concession regarding WSS services from Greater Buenos Aires to Aguas Argentinas underwent several modifications since it began in 1993: such modifications involve two already completed contract renegotiations (the first in 1994 and the second between 1997 and 1999) and one odinary revision (2001), while there is another renegotiation being discussed at present. Generally, those "renegotiations" were made by Decrees from NEP, having always favored the private concessionary to the detriment of users (see details in Azpiazu, 2003). In this process, ETOSS lost most part of its powers regarding economic regulation (e.g.: decisions about rate policy and increases), which were transfered to the National Bureau of Natural Resources and Sustainable Development. In other words, there was a gradual marginalisation of ETOSS as a regulating authority.

In the case of Tucuman, whose privatisation failed, the regulatory agency is still in place, but seems to have lost great part of its powers, as well as part of its financial resources: the regulation tax was reduced from 6% to 3% of the invoices after the provincial government transfered WSS services management to ENOHSA in late 1988.

In both cases, after several modifications on contracts, always by decree, the economic regulation followed a mixed model involving features of cost plus and price

cap methods at the same time. However, the formal regulation of the return on investment rate was never really applied.

Regulation of ownership and competition

According to Azpiazu (2003), there are no specific regulation concerning ownership or competition defence for WSS services in Argentina: no explicit restrictions on vertical or horizontal integration, or on conglomeration. "In fact", he argues, "vertical and horizontal integration was promoted by the regulatory framework itself, and competition by comparison has not been fostered" (p. 41-42). In addition, the relation between the concessionary and the real estate sector and the resale of shares is not regulated either. However, he recognizes that "Aguas Argentinas S.A. is formally subject to the anti-monopolistic or defence of competition regulation current in the country through Law 25,156 and its modifying Decrees." The Bureau of Competition, De-regulation and Consumer Defence, dependent on the Ministry of Production by Decree 375/02 is in charge of the application of this law. The financing of such bureau "comes from the national budget and its operation is controlled by the same institutions and bodies that control the whole operation of the Ministry of Production", like the Controller General, the Ombudsman and the Congress, among others (idem, ibid.).

Environmental regulation

We deal basically with two areas: i) water resources management policies and strategies, and ii) other related environmental issues.

i. Water resources management: In Argentina, the ownership of the natural resources and the necessary infrastructure for the supply of the services remain in the hands of the state, although the profits deriving from their exploitation may be appropriated by private concessionaries during the concession period. This status is established by the National Constitution which, in article 124, attributes original ownership of the natural resources in the national territory to the provinces and the corresponding municipalities involved. The same article also establishes that these territorial collectivities may be integrated into regions created for the purpose of economic and social development, setting up bodies to enforce these purposes and have international agreements, as long as they are not incompatible with the nation's foreign policy and do not affect the authority invested in the federal government or the nation's public credit, and as long as the National Congress is notified. Besides, in its article 75 the National Constitution determines that the National Congress must regulate the navigation of the internal rivers, while the making of navigation channels and the exploration of internal rivers are attributed to the provincial states (clause Number 18). During the Constitutional Reform in 1994 a new article was added, Number 41, which determines that the Nation must dictate the general norms concerning environmental protection, while the Provinces shall edict complementary norms. After the National Constitution, the national Civil Code establishes that the waters may either correspond to the public domain or to the private domain of the State. In its article 2340, such code determines that territorial and internal seas, bays,

inlets, ports, anchorages, rivers and their basins, and other waters that flow naturally as well as any waters that have or acquire the capacity to be used for the general interest, including underground waters, belong to the public domain, i.e.: belong to the State as the political body of society. These public goods can not lose their prescription, are inalienable and of free use for all citizens, as established in article 2341. Private persons have the right to use and enjoy public goods but are subject to the provisions made in the civil code and the general or local ordinances, according to article 2506. As concerns ordinary legislation, there is no national law regarding water resources yet, although in several provincial jurisdictions particular legislation with local scope has been passed. Beyond the general constitutional norms we have seen, a variety of institutional, national and provincial organs, superimposed many times, are dedicated to the management of water resources for different uses in Argentina. The institutional weft became even more complex after the privatisations process with the emergence of regulatory bodies that embrace several political administrative jurisdictions, as it was the case of ETOSS in the peri-urban area of Buenos Aires.

ii. Other environmental issues: As regards the environment, article 41 of the National Constitution establishes the right of all inhabitants to a healthy, balanced, and apt environment for human development. Besides, this constitutional disposition and other national legislation regarding the issue of environmental protection, the regulatory framework of most concession contracts contains specific dispositions concerning such matter. In the case of Greater Buenos Aires, the NEP Decree 999/92 established as one of the aims of the regulatory framework for the concession of WSS services which were in charge of OSN was to ensure that public health, water resources and the environment be protected under the concession arrangement (Article 3).

At present the Secretaría de Ambiente y Desarrollo Sustentable – SAyDS (Bureau of the Environment and Sustainable Development), dependent on the Ministry of Social Development is in charge of regulating the environment in Argentina. It is responsible for the design and implementation of the environmental policy as stated in NEP Decree 375/02. Apart from this Bureau, there is another agency within the national public administration, dependent on the national presidency, with direct influence on the formulation of environmental policy: the Subsecretaría de Recursos Hídricos (Department of Water Resources), within the Bureau of Public Works from the National Presidency, as of NEP Decree 375/02. Among other agencies, this Department contains the Tripartite Entity of Sanitation Works and Services (ETOSS), which regulates the Aguas Argentinas S.A. license.

Recent trends and expected changes in regulation

At the end of 2001, Argentina underwent one of its most dramatic political and institutional crises, which resulted in the resignation of the president De la Rua and his replacement, after four provisional presidents, by Senator Eduardo Duhalde as the Provisional President up to 2003. The new administration passed the Public Emergency

and Exchange Rate Reform Law (number 25561), by which decisive changes were made at the country's macroeconomic environment (like the abandonment of the convertibility system through the devaluation of the peso, thereby modifying the parity between the American dollar and the Argentine peso) aimed at "pesifying" the national economy, and redefining the contractual relations with the utility companies privatised during the 1990s. More specifically, article 8 of such law eliminated the dollarisation of the rates, and the resulting exchange risk insurance the companies used to enjoy, as well as their periodical indexation. Besides, article 10 of the Convertibility law was reformed through article 4 of the aforementioned law 25561, where it is ascertained (as have various court rulings) that the ban on the indexation of prices and rates was current as of April 1, 1991, opening the possibility of the revision of all rises that, through Decrees and Resolutions of a lesser legal status, had led to unreasonable rate levels. In addition, the emergency law stipulates that rate renegotiations have to consider the impact of decisions on competitiveness and income distribution, the quality of the services and the investment plans, users' interests and accessibility to the services, the safety of the systems involved and the profitability of the companies (Azpiazu, 2003: 50).

D) Brazil

This country represents a case of recent and increasing PSP in WSS services, mostly under concession and BOT contracts granted by local authorities (municipalities), in a sector which has been largely dominated by (provincial) state owned concessionaries since the early 1990s.

Policy and institutional environment

The institutional framework of water and sanitation services of the Brazilian cities is being redefined since the beginning of the 1990s, as the politics of decentralisation, "privatisation" and reconstruction of juridical and administrative apparatuses for the sector's regulation began to take place at federal level. The changes may be characterised as a transition from a state centralised and deconcentrated public services management model to another one, decentralised and 'flexible", with public and private companies competing in a simultaneously "opened" and "regulated" market.

The current institutional changes in Brazil's WSS management started with the crisis of the centralised/deconcentrated model that began to be implemented in this sector by the military regime in 1968. This management model was consolidated in 1971, with the creation of the National Sanitation Plan (known by its accronym PLANASA). Before PLANASA the great majority of urban WSS services were managed by municipal offices; the only exceptions were the capitals of provincial (federated) states, whose services were already managed by state level offices, and the country's smallest and poorest cities, which were supported by a federal health agency. WSS services were then perceived and valued as municipal services, and the private sector had been apart from services operational management since the early fifties. Despite being successful in assuring an important increase on services coverage level up to the early eighties,

specially in regards to water supply, the whole PLANASA system collapsed in 1986, harmfully touched by the country's economic recession and the heavy load of (provincial) state owned companies debts.

The most important initiative of the Federal Government aiming to build a new institutional framework for the water and sanitation was lauching the Sanitation Sector Modernisation Program (PMSS), supported by the World Bank, which started in 1994. PMSS aims at developing institutional and operational capacities of State Owned Companies, as well as a new institutional framework for the whole sector. In its first phase, PMSS was targeting the goal of services universalisation (water supply and sewage collection) until the end of 2010. The strategy conceived to reach this goal was to lean on the increase of private sector investments, as well as on increasing the global efficiency of the sector by new concessions to private capital, new contractual rules and market concurrential mechanisms. However, private operation of services should remain minor. PMSS proposed two basic principles for a new institutional and regulatory framework: 1) sector's "institutional flexibility", which means recognising that strong regional differences in revenue and technical capacity between the federated states and between the municipalities disable a national management model, leaving them to choose their proper services model; 2) the separation of functions between regulatory entities (necessarily public) and services operators (public or private).

The new political and institutional framework that emerged from the return to democracy in 1985, after a twenty-year military dictatorship, which has been consolidated in the Federal Constitution promulgated in 1988, whose main feature is a strong political, adminstrative and fiscal decentralisation of public powers, does not favour only the "municipalisation" of water and sanitation services, by greatly strengthening municipal autonomy, but also their "privatisation" through complete or partial concession to private companies. In its Article 175, the Nation's Chart determines that "it is in charge of the Public Power directly or through concession or permission regimes, always through public auction, to assure the provision of public services."[32] Besides the obligation of public auctions to establish new concession or permission contracts, this constitutional clause determines that fundamental aspects of this kind of contract, such as supervising, annulation and rescision conditions, as well as users' rights, should be regulated by law.

The regulation of such constitutional article came with the approval of the Federal Law 8987, known as Concessions Law, on February 17, 1995. This law now regulates public services concessions within the new spirit of balanced rights and obligations between the concessionary and the conceding public authority. In its 6th article, the Concessions Law establishes that "all concession or permission presupposes providing adequate services to users", defined as the ones "which fill the conditions of regularity, continuity, efficiency, security, updating, generality, courtesy in regards to users and reasonable prices".

The privatisation of WSS services by means of concessions to international and domestic companies was actively promoted by President Cardoso government, which restricted financial support to this sector's public companies, while opened new credit

[32] The permission regime comprises partial operations as BOT and management contracts.

lines in National Development Banks (BNDES and CEF) to finance private operators as well as privatisation studies and operations, together with other pro-market directives established by the Special Secretariat of Urban Development (SEDU), created in 1998, which was directly subordinated to the National Presidency.

Under President Lula's government privatisation is no longer a priority of the National Sanitation policy, which is now subordinated to the National Secretariat of Environmental Sanitation (SNSA) created under the new Ministry of the Cities, which replaced and enlarged the functions of the extinguished SEDU. The SNSA estimates that WSS services universalisation (including sewage treatment) would require annual investments of 6 billion reals up to 2020.

The Brazilian market for water and sewerage services is currently structured as follows. Approximately 75% of the urban population connected to the public water supply in more than two thirds (3,892 cities) of the 5,561 Brazilian municipalities are served by 26 State owned sanitation companies (including the Federal District one) created under PLANASA, which also cater for about 51% of the urban population served by the sewage collection network in around 14% of Brazilian municipalities (802 cities). Other 1619 municipalities, representing 21% of Brazilian urban population, are supplied with drinking water by municipal sanitation companies or departments, which are also responsible for the sewer drainage of 4,715 municipalities catering for about 45% of the country's urban population. Among those municipal sanitation works, around 300, situated in the smallest and poorest cities of the country, have federal support from the National Health Foundation.[33] Finally, according to recent data (2003) given by the Brazilian Association of Private Concessionaries of Water Supply and Santitation Services (ABCON), private operators provide almost 5% of the urban population with such services (around 6,5 million people) in 60 cities (including full or partial concessions of water and sewerage services, as well as BOT contracts).

Regulatory Framework

Water services quality regulation

It comprises i) the quality of drinking water and ii) the quality of the supplying service, encompassing as well iii) the regulations regarding consumer rights.

i. Drinking water quality: The quality standards for drinking water are fixed by the Ministry of Health. According to its last resolution on this subject (order 1469/2000), although the adequacy of drinking water supply to these standards is the direct responsability of the services' operators (public or private), it is in charge of Provincial and Municipal authorities to verify their compliance, to register independent sources or providers and to correctly inform people about health risks related to water consumption. Although States and municipalities

[33] Approximate data taken from SNSA (2003).

were given two years to adapt to this rules, some of them are not quite yet in compliance with them.

ii. Service quality standards: According to the 6th article of the Federal Law 8987/95, "every concession or permission [of any public service, either to private or public operators] presupposes the provision of adequate services to fully attend users, as established in this law [...] and in the respective contract". In its 1st paragragh, this article defines the adequate service as "the one which satisfies the conditions of regularity, continuity, efficiency, security, actuality, generality, kindness in public attendance, and reasonable rates". The services actuality is precisely defined in the 2nd paragraph as "the modernity of technics, equipments and plants, including their conservation, as well as the services improvement and expansion". Finally, the 3rd paragraph establishes that services interruptions in "emergency situations" related to technical or security problems may not be considered as "services discontinuity", nor interruptions related to unpaid bills, "after previous notification, considering the collectivity's interests". This general principles normally figure in all concession contracts, being regulated by contractual rules whose application is in charge of local and regional (provincial) agencies, with different legal status, which have the power to apply fines and penalties for non compliance.[34] There is no national regulatory agency in charge of establishing and controling WSS services' quality standards.

iii. Consumer rights and participation: WSS services' quality may also be regulated, to a certain extent, by the users own requirements concerning the defense of their rights as consumers. The Federal Law 8072, approved in 1990 and named the Consumer's Defense Code (CDC), which has among its principal aims "the rationalization and improvement of public services", compels public authorities and/or their concessionaries to provide adequate services to all users. Besides the latter, this code assures that the consumers have the right to receive "education about the adequate consumption of products and services", as well as "clear and adequate information" about them, "with the correct specification about the respective quantity, characteristics, composition, quality and price" (art. 6). It forbids all providers of any product or service to prevail upon a consumer's weakness or ignorance, given his age, health, knowledge or social condition, to inflict them on him" (art. 39). The same law has also instituted the National System of Consumer's Defense, which aims at linking organs from the federal, state and municipal administrations specialized in this matter under the coordination of the Ministry of Justice's Economic Rights Secretariat. In practice, the consumer's defence is being assured mainly by public organs belonging to the States together with some NGOs. Although any breach of CDC's rules may be punished by fines and harder penalties, as the revocation of a public services concession, it's clear that its real application depends on users adequate

[34] In the studied cases of Limeira and Niterói the regulating functions were assumed by previously existent municipal organs: respectively, the former WSS services public operator and a municipal company created for other purposes before the concession. In the PROLAGOS case, were the concession involves five municipalities and the State of Rio de Janeiro, the contract's regulation is in charge of ASEP, an autonomous and multi-sectorial agency belonging to this state's indirect administration.

information. In this sense, the National Information System on Sanitation (SNIS), which yearly makes a national survey on WSS performance, involving many tecnical, economic and financial indicators from public and private operators working either at local, regional or provincial level since 1995, is a very important instrument to be known and used by citizens organisations engaged on this sector's issues. Futhernore, the Federal Constitution assures that any citizen, independently of any tax payment, may be a legitimate part in lawsuits aiming at annuling any act which may cause damage to the public property, the admistrative morality or the historical and cultural inheritance". The same principle was already present at the Federal Law 7347/85, known as Spread Interests' Defense Law, which gives power for any citizen, represented or not by a civil association, to sue either the concessionary or the granting authority for non compliance with its obligations regarding the provision of adequate services.

Economic regulation

The concession or permission contracts may be considered as the main instrument of economic regulation for WSS run by private operators. Normally based on the cost plus approach, the economic regulation is focused on keeping the contract's economic and financial balance, which means stipulating average rates that assure full cost recovery plus a fixed remuneration for the recognized investment, as well as updating rules based on the annual evolution of some specific cost indicators. The application of these rules and the verification of these indicators is in charge of the same municipal or regional organs charged of WSS quality regulation, while the rates updating or increases normally must be approved, in the last resort, by the respective granting authority. But there are exceptions, as in the case of PROLAGOS, where these functions are in charge of ASEP, the regulatory agency.

However, neither the equation which expresses the contract's economic and financial balance nor the return on investment rate are always explicit in the contractual terms: these are among the most obscure aspects of all cases of WSS services concessions to private operators we have studied in Brazil. A similar scheme of economic regulation also prevails in the case of public concessionaries, as the State Owned Companies from provinces, with some important differences: a) for historical reasons, some cities "concessions" are run by those companies without any regulating contract at all with the respective municipality; b) the old concession contracts signed by municipalities with those public companies, under the framework of PLANASA, which remain in force don't give to municipal authorities any prerrogative regarding rates adjustment; c) in those latter cases, rates adjustments are decided by the own companies, being subject to the state governor's approval.

Regulation of ownership and competition

Although some of its elements existed before, the National System of Competition Defense was established and regulated by the Law 8884, approved in 1994, which aims

at preventing and punishing economic abuses from private or public enterprises, as well as market concentration. This system is composed of three elementes: the Administrative Council of Economic Defence (CADE), its central organ, which is organized as an autarchy whose president and members have fixed mandates with powers to intervene on acquisitions and mergers (that it may declare ilegal and extinguish), as well as to apply fines; the Secretariat of Economic Supervision (SEAE), subordinated to the Public Finance Ministry, which is the organ that first appreciates any process related to market concentration, analysing micro-economic and macro-economic aspects related to any specific sector or activity, sending its view to the Economic Rights Secretariat (SDE); subordinated to the Ministry of Justice, this latter will examine the legal aspects involved, sending his views to CADE's deliberation. At present, no decision regarding WSS was submitted to the National System of Competition Defence. In regards to WSS, where actual competition is very limited, given their structural condition as natural monopolies, the creation of SNIS and the publication of its annual sector survey is very important, for it may be improved and used by regulators and policy makers as an instrument of yardstick competition.

Environmental regulation

It involves i) water resources management policies and strategies, and ii) other related environmental issues.

i. Water resources management: Until the late early 1990's, Brazil did not have any national or regional policy for water resources integrated management. Such policies began to be formulated in the process of rebuilding a new institutional order, after political democracy came back to the country in 1985. In this connection, the Federal Constitution approved in 1988 established that the Union should create, pursuant to a federal law, a National System for Water Resources Management, as well as define criteria for granting usage rights to its sources (21st article). This constitutional article was regulated by the Federal Law 9433, promulgated in early 1997, which establishes the Water Resources National Policy and creates a Water Resources National System, which is linked to similar laws which were already approved befre or that would be approved later at provincial level. Water resources policies, at both levels, follow a integrated, decentralized and participatory management model, which is based on planning and decision-making by deliberative riverbasin's committees composed by society's and public power's stakeholders, with access to special purpose funding (see details on Appendix 2, pp. 93-94). So, we may say that Brazil already has an advanced water resources legislation, which is already being gradually implemented. However, such legislation do not seem to be taken into account on the recent concessions of WSS services to private operators: none of the contracts of concessions we studied for PRINWASS research had any clause related to the achievement of goals linked to the already existing riverbasin plans.
ii. Other water related environmental issues: The "environmental regulation" had a premature start in Brazil around last century's mid 30's, during a period of growing industrialization fostered by central state, with the institution of the National Code of Waters and the National Code of Forests, both approved by decree in 1934. In fact, the spirit of both codes was to discipline the economic

exploitation of such resources. Anyway, the former established important principles regarding water resources –whose abstraction (excepted insignificant amounts) became subjected to public license, regardless of the uses– some of them still remain in force. It also established important rules and principles to regulate the concession of electric power services following the return over investment rate's method. The latter tryed to protect the riparian woods, declaring riparian lands up to 30 meters from river banks as permanent protection areas where any building is forbidden. Environmental policy and regulation, properly speaking, began to appear much later, in early 70's.

After having lead the developing world resistance to accept environmental restrictions to the use of natural resources for national development at the UN Stockolm Conference on Human Environment (1972), coming from some developed countries propositions, Brazil's central government decided afterwards to build a better international image regarding environmental issues. So it created in 1973 the Special Environment Secretariat, subordinated to the Interior's Ministry. However, the National Environmental Policy had to wait untill 1981 to be instituted by the Federal Law 6938, which created as well the National System for the Enviroment. According to this law, Brazil's National Environmental Policy aims at preserving and enhancig the enviromental quality favorable to the development of life, which should be pursued together with economic development. As per the National System of Environment, this law proposed that it should be composed by the Union's, the States' and the Municipalities' specialized organs, as well as the National Council on Environment (CONAMA). Being effectively implemented only after 1985, with the country's return to democracy, this latter is a consulting and deliberative council composed by federal government and civil society organisations' representatives, under a parity scheme, which is in charge of establishing criteria, rules and technical parameters for licensing public and private activities which may pollute or damage the natural resources and the environment. The whole system was placed under the framework of the Urban Development and Enviroment Ministry, created by decree in 1985, which had an ephemeral existence together with the National Presidency's Special Secretariat on Environment, created in 1990 to prepare UN Conference on Environment and Development held in Rio de Janeiro in 1992.

The National Environmental System was finally completed by the creation of IBAMA (Brazilian Institute for Environment and Renewable Natural Resources), created in 1989 by Federal Law 7735, and the Ministry of Environment, instituted in 1992 by the law 8490, under which was created the National Secretariat of Water Resources – SRH. Subordinated to the same Ministry, the IBAMA is in charge of enforcing the environmental regulations approved by CONAMA, including the control of water resources pollution (attributions delegated by SRH and ANA). The most important of CONAMA's rules affecting water sector are the resolutions 1 and 20, both approved in 1986. The former establishes the obligation of preparing Environmental Impact Studies and Reports for licensing any activity which may cause environmental damage, including, e.g., the building of water/sewage treatment plants. The latter establishes chemical and bacteriological parameters of fresh water quality for classifying water bodies accordingly with preponderant uses they may allow. Based on quality goals, rather

than the actual condition of the waters, these national parameters are used by the Union's and States' pollution control and enforcement agencies to monitor the quality of raw surface and undergroud waters.

Recent trends and expected changes in regulation

Besides the resistance from municipal services workers and the sector's professionals organized in technical associations, public concessions of water and sanitation services to private companies face institutional difficulties. According to the juridical and administrative tradition established in this sector, sanitation services are seen as a municipal competence; consequently, only the municipal public powers could decide to concede them. This legal limitation remains a powerful obstacle that has interrupted recent attempts to privatize some of the state owned water and sanitation concessionaries, which find themselves impeded to transfer local services concessions they hold to their possible buyers without the formal consent of, and eventually the payment of compensations to, the respective municipalities.

However, the question of municipal jurisdiction in this sector is very controversial. Contrary to the preceding national charters, the Federal Constitution of 1988 establishes basic sanitation as a sector in which prevail "common or complementary" competences between the three government levels of the Brazilian federation (Union, States and Municipalities); it does not establishes any exclusive attribution to municipalities in the field of basic sanitation, except in cases characterized as "local interest services" (30th article). Indeed, the Constitution (23rd article) establishes that there should exist permanent cooperation between the three governmental levels in this field, guided by rules to be fixed in Complementary Law. We may easily recognize municipal competence for most of water and sewerage works, as they are organised as local interest services in most of Brazilian cities. But, on the other hand, many water and sewerage systems are already integrated on regional infrastructure networks that surpasses the municipal limits in metropolitan regions and other urban agglomerations. In such situations, different interpretations on the services legal entitlement or conceding power may appear.

The Law proposal 4147, which was prepared by federal government's initiative and submitted to Congress on February 2001, was an attempt to regulate this issue which has impeded the privatisation of State Owned Sanitation companies, as it would transfer from municipalities to the States the conceding power over WSS services in metropolitain areas and urban agglomerations where these services infrastructure are already totally or partially integrated. It also would forbid concessions based on the payment of entry fees. However, in the beginning of Lula's government, the new Minister of the Cities, which is favorable to municipal competence in this field, asked government leaders on Congress to withdraw this law proposal from voting. Currently, a new National Policy for WSS services is being debated between federal government and stakeholders, under the leadership of the National Secretariat of Environmental Sanitation. The issue of services entitlement - i.e.: the definition of which government level shall be recognized as the concessor or conceding power of WSS services and infrastructures – in metropolitan and conurbated areas is proving to be one of the most controversial points to be regulated, as

well as the most crucial for opening new attractive markets for large scale privatisations in this field.

E) Kenya

Although still limited to management contracts involving mostly small areas and small private providers, the Kenyan experience with formal PSP arrangements in WSS services will be probably further developed, especially in urban areas, under donor's promoted policies. It represents a challenging case where increased PSP may not be socially sustainable without significant efforts previously done in the reform of water sector's policy, institutional and regulatory framework, with special regards to capacity building of local authorities and community organisations in this field.

Policy and institutional environment

In Kenya about 18.5 million persons, representing approximately 65% of the country's population, have access to some form of piped or improved water supply. About 2.5 million people in rural areas (where almost two thirds of the Kenyan population live) are served by about 10,000 improved point water sources and 16.5 million people obtain their water from about 1,000 urban and rural piped water supply systems. In urban areas, about 70% of the population has direct access to piped water through house or yard connections.[35] In regards to sewerage services, data on coverage and number of connections are not readily available. However, according to estimates from experts about 2.0 million people in urban areas are connected to 35 sewerage systems (Mehta and Ondari, 2003, cited in Nyanchaga (2003). The same sources indicate that about 21% of the urban population relies on sewers, 47% on pit latrines and 23% of septic tanks, and 2% have no access to sanitation facilities, while nearly 76% of the rural population has access to excreta disposal facilities (which means pit latrines to practically all of them).

Considering only drinking water supply public providers are responsible for almost 80% the covered population in both urban and rural areas, while the remaining 20% rely on "third sector" and informal private initiatives: on one hand, self help groups and community based organisations, which are very active in rural areas, where they serve almost three million people; on the other, a large number of private small scale informal providers acting mainly in the large urban centers, which serve about a million people in those cities (Nyanchaga, 2003).

So far, the formal involvement of professional private enterprises in WSS services in Kenya has been limited to contracting out activities such as consulting, design and building of water and waste water works, supply of equipment, as well as a few

[35] However, this accessibility is highly doubtful when one considers that a big majority of the urban population (for instance, over 60% of the population in Nairobi) live in informal settlements where access is of very low quality. In addition, we must say that multiple households share a vast majority of domestic connections in small and medium towns.

management contracts of some urban water systems.[36] Yet, the failure of the public sector to provide adequate water and sanitation services to a significant proportion of the population encouraged informal private service providers to step in to meet the demand, particularly in informal urban areas. Similarly, some industries, institutions, firms and homes have developed private water supply and sanitation facilities. In some cases these facilities have benefited the general public in the neighbourhood. Anyway, as institutional reforms proceed, new opportunities for PSP are likely to emerge.

Coming back to public providers, the central role in this sector is played by two national authorities, the Ministry of Water Resources Management and Development (MWRMD) and the National Water Conservation and Pipeline Corporation (NWCPC). The former, which recently replaced the Ministry of Environment and Natural Resources in its functions related to water issues, act as a service provider through its provincial and district offices, being responsible for the supply of water to one third of the country's population covered by this service, and half of the population with access to it in rural areas. The Ministry also supports policy development, and as the sector regulator, provides the rights to the use of water resources. Under the new Water Act 2002, its role will be restricted to policy formulation, sector coordination, financing and research. As per the NWCPC, it is a state corporation established to take over the management of WSS systems that could be run on a commercial basis. Its long-term objective is to manage specified gazetted projects in a self-sustaining manner at an affordable level. Some of its sub objectives included: to commercialise water sector operations; to achieve financial autonomy in water operations; to improve performances and efficiency of water systems; and to reduce dependence on public funding of independent water schemes. The corporation provides services in both urban and rural areas and has established regional and area offices through which the water systems are administered. It operates in six out of the eight provinces in Kenya with a total of 43 systems and serves about 1.5 million people in the Coastal region and an additional 2.3 million in other areas. Within this jurisdiction, NWCPC determines the appropriate supply standards and water tariffs, with the approval of MWRMD.

Besides both national providers, some local authorities also play an important role in water supply in urban areas, where they share alone around one half of the covered population. Local authorities are autonomous, self-governing entities under the Local Government Act regulated by the Ministry of Local Government (MoLG). For providing water supply, local authorities have to apply for a water undertakership to the ministry in charge of water affairs. About nine local authorities currently have such a mandate. The largest is Nairobi City Council with service coverage of about 1.8 million population. There are about 20 other Municipalities and 19 town councils, which do not have a water undertakership, but provide water services in their jurisdiction, as water distributors or by extracting water from small systems such as boreholes. For service delivery, local

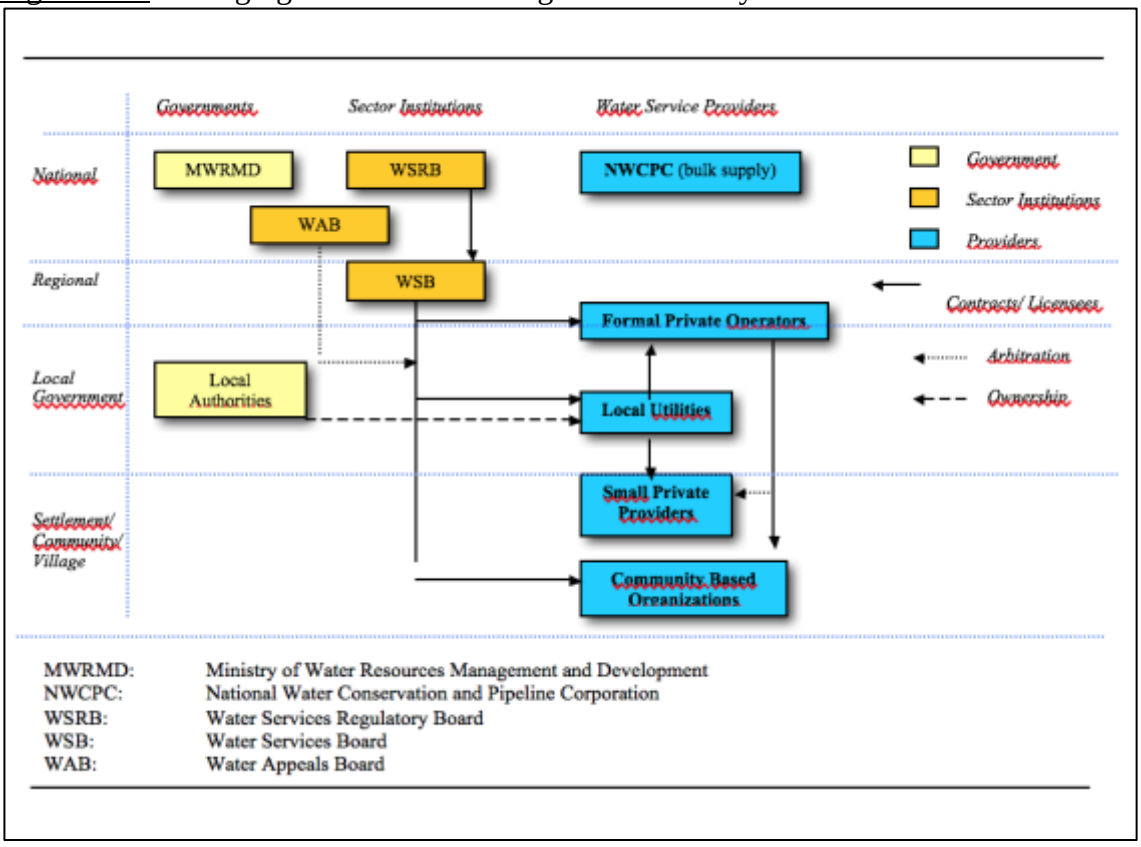
[36] Management contracts to fully operate services administration and maintenance of small systems were held in Malindi and Tala townships. The former was developed from a service contract on "Improvement in Billing and Revenue Collection", financed by the World Bank, while the latter is a 30-year contract signed by Kangundo County Council with a German company in July 1999. But Kenya's most important PSP operation would be Nairobi's 10-year contract for water Billing and revenue management which failed to be signed with a Vivendi subsidiary in 1999.

authorities operate through their water supply departments. A few local authorities have taken the initiative under donor projects to set up local utilities fully owned by them, but expected to operate and provide WSS services on a commercial basis. The Board of directors consist mainly public officers, with a few representatives from the community served, and include the Mayor, Town Clerk, Town Treasurer, the Managing Director, representatives of MWRMD, MoLG and Ministry of Finance as well as representatives of business community, women and consumers.

Finally, community-based organizations play a significant role in the provision of Rural Water Supply and Sanitation services. Though most have been promoted through NGO or donor projects, there are a sizeable number of schemes promoted by self-help groups (SHGs) themselves. They operate schemes ranging from large piped schemes to small communal water points. Details of actual numbers cannot be properly ascertained, but estimates suggest that both together would share around 30% of the population covered in rural areas. Most groups are registered as Self Help Groups with the Ministry of Culture and Social Services or under the Societies Act.

Over the past several years, the Government of Kenya has embarked on a process of defining reforms in the WSS sector, with an emphasis on introducing institutional arrangements that address some of the constraints in the efficient provision of services. This culminated in the new Water Act that received the Presidential assent in 2002. Figure 3, on the next page, provide an overview of the institutional arrangements envisaged under this Act. Several new sector institutions are being planned with a focus on separating the functions related to planning, operations and regulation to MWRMD, water services boards (WSBs) and the Water Services Regulatory Board (WSRB) respectively. It is envisaged that all the water services assets will be transferred to the WSBs who in turn will contract with one or more water service providers (WSPs) to provide water in their jurisdictions. While the type of WSPs is not specified, it is expected that services will provided "on a commercial basis and in accordance with sound business principles'. Some key provisions suggest that of the existing WSPs, the Ministry and the local authorities cannot themselves be water service providers. For local authorities a possibility would be to create independent utilities operated on commercial principles (Mehta and Ondari, 2003).

Figure Nº 3: Emerging Institutional Arrangements in Kenya



Source: Mehta and Ondari, 2003.

Regulatory Framework

As we said before, the whole water sector in Kenya is passing through an effervescent activity of policy buiding and reform, which includes new strategies and legislation regarding services management and regulation. Implementation of the water sector reform is outlined in the sector strategy documents that were further developed in 2002-2003: National Water and Sanitation Services Strategy (NWSS, 2003) and National Water Resources Management Strategy (NWRMS, 2003). National Water Services Strategy (NWSS) provides a framework to achieve decentralisation, injection of efficiency and increase sustainable access to improved Water services as legislated in the Water Act 2002. The other cross-sectoral issues including agriculture, energy, environment and industry are covered in the National Water Resources Management Strategy.

Water services quality regulation

The legal framework for the management and provision of Environmental Sanitation and Hygiene (ESH) in Kenya is found primarily in statutes that make provision for dealing with the issues identified as relevant for the management and provision of sanitation. No one statute deals specifically with ESH. Such laws are designed with other objectives in mind and make provision for environmental sanitation and hygiene only as an incidental spillover from the other predominant objectives of the particular statute in question.

Consequently, the law affecting the provision, management and regulation of environmental sanitation must be gleaned from several statutes. The key statutes affecting Environmental Sanitation include: The Public Health Act, Cap 242, The Local Government Act, Cap 265, The Rating Act, Cap 266, The Valuation for Rating Act, Cap 266, The Environmental Management and Coordination Act, 1999, The Physical Planning Act, 1996, The Street's Adoption Act, Cap 406, The Food, Drugs and Chemical Substances Act, Cap 254, The Malaria Prevention Act, Cap 246, The Water Act, Cap 372 and The Water Act 2002, The Factories Act, Cap 514 and The Education Act, Cap 211. Each of these statutes has its own internal objective, which is determined by its primary area of focus. Thus, they do not have a common policy orientation, and whatever policy orientation they have is not focused on ESH as the primary area of focus. This creates a risk of internal policy contradictions. The two exceptions to this general situation are the Public Health Act, Chapter 242 and the Local Government Act, Chapter 265, which have some quite specific provisions on environmental sanitation.

The Public Health (Drainage and Latrine) Rules, L.N. 138/1959 and L.N 92 of 1960 have been made under these provisions. Under the rules the local authority is expected to enforce the drainage of undrained buildings by requiring the owner of such building to make a drain emptying into the sewers of the local authority. Rule 6 states that no person shall erect or occupy a new building or a reconstructed building unless a drain or drains have been constructed as may appear necessary to the local authority for the effectual drainage of such building.

The Local Government Act, Cap 265, Section 168 empowers local authorities to establish and maintain sewerage and drainage works. Under section 175 a local authority may construct drains or sewers which in its opinion are necessary for the satisfactory drainage of any land and may recover from the owner of such land or apportion and recover from the owners the cost of any such drainage or sewerage work on such land or premises. Alternatively, it may advance to the owner of any land or premises the cost of any such drainage or sewerage work on the land or premises. The expenses and advances together with interest shall be charged upon the relevant land or premises and shall be paid to the local authority by the owner.

There is no provision made in the law for the provision of sanitation by other service providers. Consequently, the current provision of sanitation by others, in particular small-scale service providers who have operations in unplanned settlements, are carried out without any legal framework, or regulation. In the absence of regulation the activities of small scale service providers can themselves pose an environmental problem, in so far as the technologies and solutions adopted can lead to other problems, such as water pollution, odour, disease and so on (Mumma, 2001).

Another issue arising from section 175 of the Local Government Act relates to standard of ESH facilities prescribed by law. Under section 175, septic tanks, conservancy tanks, waste water pits and such like devices shall not be considered satisfactory means of drainage to justify the local authority incurring capital expenditure to develop them. This provision excludes the bulk of sanitary facilities in urban centres, and means that local authorities must incur expense towards developing the most expensive sort of sanitation and drainage facilities, i.e. water borne sewerage systems. This limits technological options (Mumma, 2001). On the other hand, section 176 makes the local authority a regulator as well as a service provider. The local authority shall have the power among other things (a) generally to regulate sewerage and drainage; and (b) to compel the construction of private drains and the connection of private drains to public drains, sewers or pipes. In many contexts, this dual role has made it difficult to enforce the performance of the obligations of the service provider and increasingly is being abandoned (idem).

There is no specific statute in the Country's laws to deal with environmental sanitation activities. There are however many statutes dealing with other services but with weak clauses for dealing with environmental sanitation as a secondary issue for achieving the primary goals of the main statute. In total, there are about twelve statutes touching on environmental sanitation but the main ones are: The Public Health Act Cap 242, The Local Government Act Cap 265, The Water Act Cap 372 and The Native Ordinance Act Cap 128.

The Act empowers the Ministry of Health to oversee all health services including environmental sanitation services, in the country. The act was enacted in 1921 during the colonial administration, and no amendments have been effected since 1970. This indicates that some of its provisions are outdated and may not adequately cater for the present day environmental sanitation requirements. Most of the clauses of the act appear to address sanitation services in big towns. It is not clearly stated in the act as to what type of human excreta disposal facilities rural households should maintain and the corresponding enforcement measures for default.

The Act empowers the chief to issue emergency orders to the people living in an area where an outbreak of disease has occurred. This act has been used to enforce adherence to the public health act when there is an emergency. Section (10) and (12) of the act has been occasionally used by the government to force rural households to dig and construct pit latrines during cholera or typhoid outbreaks.

Economic regulation

The existing Water Act does not support the Water Undertaker in collecting monies owed by consumers. The water undertaker has to go through a lengthy and expensive way to collect his debt. Under the Act, economic regulation is to be undertaken by Water Services Regulatory Board (WSRB). The board is responsible for the performance of both Water Services Boards (WSBs) and Water Service Providers (WSPs) and approving the tariffs set by them. This replaces the current system of this responsibility resting with the Minister in charge of water services. The mechanism by which tariffs will be legally managed appears in Section 47(g) and 57(5)(c) of the Water Act 2002. Although the WSB is entitled to determine the tariff structure for its service area, the ultimate regulatory responsibility for developing guidelines and approving tariff structures rests with the WSRB.

If the Water Act, 2002 ultimately provides the enabling environment for a simple and straightforward methodology for developing regulatory and institutional procedures then a number of the potential legal issues and hurdles will be resolved. Under the current legislation the Act creates two statutory bodies. The first, the Water Resources Management Authority will reside with the Ministry of Water Development and resources, and is responsible for catchment management, water apportionment, pollution control and the enforcement of laws relating to water resources management. The second structure, the Water Services Regulatory Board is the licensing body and economic regulator. The Water Act creates "water services boards" which are intended to have responsibility for water and sanitation services in a defined area. The methods by which water and sewerage assets will be transferred to these water boards have not yet been established.

Regulation of ownership and competition

A Water Service Regulatory Board has been established under the Water Act 2002 whose only linkage with the MWRMD is through legislation will regulate all matters of water supply and sanitation service provision through direct supervision of the WSBs. Apart from exceptional situations, the WSBs will not themselves provide services directly but through entering into contracts with licensed water Service Providers appointed through competitive tendering. WSBs will come into operation in areas delineated based on viability studies. The WSBs will sub-contract most of the tasks related to selection of private WSPs, preparation of projects and financing applications (NWSS, 2003).

Under section 53 of the Act responsibility for provision of water services is vested on the WSBs while existing public assets currently held by MWRMD, NWCPC, Local Authorities and community supplies will be transferred to the WSBs. WSBs may, where necessary, lease assets in addition to ownership and may access loans using the assets as collateral. The WSBs will also be responsible for preparation of business plans for operation and maintenance, development and extension of WSS services. The Boards have full mandate to ensure that services are provided within their areas of coverage without leaving any gaps. If the WSBs fail to perform, the WS Regulatory Board will remove the non-performing board member(s) using provisions of the Act, and replace him/her, while maintaining continuity of operations (NWSS, 2003).

The Water Act 2002 provides for an Appeals Board where complaints from WSBs, WSP Service Providers and consumers on the provision of services and regulation can be lodged and attended to. The law will provide a mechanism whereby the provision of services is not stopped as a consequence of the appeals mechanism. The Minister for water affairs will appoint the Appeals Board, in accordance to the provision of section 84 of the Act (NWSS, 2003).

Operations of existing and future SHGs and NGOs must be regulated and hence will fall within this institutional framework. For this reason the WSBs will provide technical support to these communities, SHGs and NGOs. In such instances the WSBs will assume certain regulatory roles over the WSPs as per contractual arrangements entered into by the WSB and WSP, in accordance with section 55 of the Act (NWSS, 2003). The WSP will include PSP, NGOs, communities, and SHGs etc. The Water

Services Providers will require licensing by the WS Regulatory Board to qualify for submission of bids to operate water facilities. As mentioned earlier, WSP will enter into a contract, for the operating of the facilities, with the WSBs. LAs, especially in urban centres, may also form companies and bid for operation of services like the other WSP. So these LAs companies will require licensing by the WS Regulatory Board and will be supervised by the WSBs (NWSS, 2003).

Environmental regulation

The Environmental Management and Coordination Act 1999 (EMCA) came into effect on 14th January 2004 and was the culmination of a long and active process that started in 1993. Prior to the Act coming into force, environmental aspects were contained in over 77 existing sectoral laws and regulations. The EMCA is therefore referred to as a framework environmental law. The Environmental Management and Coordination Act provide an institutional framework for the management of the environment and for connected and incidental matters. The Act establishes an environmental coordinating body, the National Environmental Management Agency (NEMA), and a Standards and Enforcement Review Committee. The Committee shall set standards for, among other activities, the management and disposal of waste.

Section 87 prohibits the discharge or disposal of wastes in such a manner as to cause pollution of the environment or ill health to any person. Section 88 imposes the requirement for a licence by any person who transports, or operates a waste disposal site or plant. The Act also requires that trade or industrial effluents be discharged only to an existing sewerage system. Presumably, this would include domestic effluent from a trade or an industrial undertaking. Water pollution control is provided for in the old Water Act, Cap 372 and section 76 of the Water Act 2002.

The Public Health Act empowers the Ministry of Health to be in charge of sanitation activities in the country, yet it also (Section 155) empowers Local Authorities to demand to be allocated land by the Ministry of Land, in which to construct public toilets. The Local Government Act on the other hand vests the control, regulation and responsibility of providing sanitation services with the local authorities in their areas of jurisdiction. The Act does not however give the Local Authorities enforcement powers assuming that the Ministry of Health shall do it. It is however, the Office of the President through the Chief's Act that carries out enforcement but only after disease outbreaks such as cholera and typhoid.

The proposed environmental regulator created under the Environmental Management and Co-ordination Act has not yet been established and therefore has no history of operation. In addition, the Standards and Enforcement Review Committee (also created by virtue of the Environmental Management and Co-ordination Act) is given the responsibility for establishing water quality and effluent standards, but such standards do not yet exist.

The absence of existing environmental standards is likely to introduce some uncertainty among prospective bidders and is likely to have some of the following impacts:

- In all of the possible PSP options, except a management and service contract, prospective bidders may have difficulty pricing the contract and, if applicable, the required investments in the absence of some certainty about the new environmental standards that are about to be developed. This is not an insurmountable contractual issue provided that it is consciously and carefully dealt with during the drafting process.
- Notwithstanding the absence of existing environmental standards there is a Penal Code offence for general "pollution offences". The bidders will have to be given some level of comfort in terms of their protection from such offences in the event that the pollution is beyond from such offences in the event that the pollution is beyond their capability to control.

Recent trends and expected changes in regulation

The old Water Act Cap 372 had the following bottlenecks in the water sector: lack of clear regulatory framework; lack of performance monitoring and evaluation indicators; and poor performance of water-undertakers. These bottlenecks led to conflicts on checks and balances; and conflicts on allocation of water resources. Hence, the situation led to poor service provision characterised by the following phenomena: poor management of water resources (both quality and quantity); failure to attract and retain skilled manpower; inadequate allocation of resources; poor service delivery; low coverage; inability to attract investments; and dilapidated infrastructure.

As part of the reforms process, the new Water Act 2002 was enacted on October 2002. The themes of the Act are: decentralization of Water Resources Management to a lower level to improve governance; reduces overlap among the actors; reduces conflicts among institutions; enhances coordination; provides financing mechanisms to increase service level and investment; and helps implementation of strategies for WSS services and Water Resources Management.

For efficient water regulation, operations of the sector, the new Water Act 2002 has set out regulatory levels as shown below:

- At national level: Water Resources Management Authority (WRMA) and Water Services Regulatory Board (WSRB). The WSRB is the licensing body and economic regulator.
- At regional level: Catchment Areas Advisory Committees and Water Services Boards (WSBs). The WSBs have responsibility for water and sanitation services in a defined area. The methods by which water and sewerage assets will be transferred to these water boards has not yet been developed.
- At local levels: Resources Users Associations and Water Service Providers (WSPs).

The expected outcomes under Water Act 2002 are based on r clear regulatory framework, performance monitoring and evaluation, and improved performance of water undertakers. The proposed institutional framework with in the MWRMD envisages six

ministerial departments and three statutory bodies under the minister. This structure appears to allow the MWRMD to retain executive functions (e.g. allocation of water resources), contrary to both the National Policy and the Water Act, in three areas (World Bank, 2003):

- Water resource management is clearly the responsibility of the WRMA under the act, yet there is Department of Water Resources Management to be formed with executive functions such as 'drilling."
- Water supply and sewerage is the responsibility of statutory bodies (WRSB and WSBs), yet there is a proposed Department of Water Supply and Sewerage.

Data Documentation & IT is central to the water allocation and management operations of the WRMA and the WSRB and their regional offices. The proposed structure seems to imply that data management activities would be centralized in a department of the ministry.

Comparative remarks about Water Sector trends regarding policy, institutional and regulatory issues

After having described WSS services policy, institutional and regulatory framework in each of the studied countries, we try to draw a comparative analysis of their differences and similarities, strenghts and shortcomings in this section, focusing the analytical/comparative dimensions we proposed in section 3.3. Obviously, the following lines reflect a comparative strategy among other possible ones, and represent only a few general remarks that may be further developed in other works.[37]

a) The relationship between the public and the private sector

In Argentina, as we have seen, private operators are nowadays a dominant actor in WSS services management, under long term concession contracts signed mostly with national and provincial authorities. Large scale concessions were granted to the world leading transnational companies acting on this field in the early 1990s, under difficult political and economic circumstances, by means of decrees and emergency acts that impeded public debate and citizen participation. In this context, there was too much "improvisation" in building new institutions and rules to regulate such concessions, which were constantly modified afterwards by authorities to favor private operator's interests to the detriment of the users, allowing extraordinary rate increases and profits and minimizing business risks by transfering investment on network expansion to users themselves through new charges. We may say that is precisely the absence of an adequate regulatory framework, especially in regards to the structure of regulatory governance (as discussed below on "b"), which permited the capture of the political power by private

[37] For a summarized version of our comparative analysis for each dimension, except the last one, see Tables Nº 4 and 5 in the Appendix.

operators, what explains the general failure of the Argentinean experience of PSP in the field of WSS services.

In Brazil, there is a growing participation of private companies in the management of WSS services, mostly through concession and BOT contracts, always granted by local authorities. Yet, the participation of private operators in the provision of such services is still limited to less than 5% of the countries urban population, involving no more than 60 cities (including the capitals of two provincial states) among all 5,561 Brazilian municipalities. The clear domination of provincial states owned companies submitted to private law as suppliers of WSS services since the 1970s has not hindered, but rather facilitated, the increasing outsourcing from private sector, which may be seen as a well developed tradition in Brazil.

In Kenya, the role and capacity of private sector in the field of WSS services has been fairly limited until these days. Traditionally, in urban areas, either the government (the water ministry or its parastatal corporation) or the municipalities have been responsible for water and sanitation services. In rural areas, community-managed water systems have been run for decades and they became very common since the 1980s as a result of extensive development cooperation. The public organisations operating the urban water and sewerage systems in Kenya have not widely utilised services from the private sector in the form of outsourcing, although of course private sector has supplied materials and equipment for the systems.

In 1999 the Government published Sessional Paper Nº.1, "the National Policy on Water Resource Management and Development" (commonly known as the National Water Policy). Among other strategies, the policy paper emphasizes an increased role for the Private Sector in service delivery taking into account the need to ensure that the commercial principles that drive PSP do not undermine Government's aspirations as defined in the Poverty Reduction Strategy Paper by limiting access of the poor. The absence of written policy in the past, prior to the Sessional Paper No. 1 of 1999, created room for sector actors to implement policies devoid of holistic approach to sectoral objectives.

As we have seen in the preceding section, there are a couple of privately owned and operated water supply systems in urban areas in Kenya, but they are fairly small – such as the Runda residential area in Nairobi. In Malindi town water supply is managed through a management contract run by a German consulting company.

However, there have been substantial reforms planned and ongoing in the water sector in Kenya. These reforms also aim at a wider role for the private sector in water services provision and production. Already the earlier semi-autonomous water and sewerage departments of largest municipalities have been transformed to autonomous municipal companies, who basically operate using commercial operating principles similar to private enterprises. Some of these companies – such as the Nyeri Water and Sewerage Company (NYEWASCO) – have been fairly successful, but in some towns similar reforms proved unsuccessful and the government even reverted back to resume operational responsibility for the utility (for instance in Kitale and Nakuru).

In Finland, at present, the public sector is predominantly responsible for water and sewerage services. In urban areas, almost all water and sewerage utilities are owned by municipalities, who also operate the services through their autonomous municipal enterprises. With the enactment of the Water Services Act (119/2001) all municipalities

should separate the budgeting and accounting of their water utilities from the overall municipal budget and make utilities autonomous enterprises. Presently most of the large and medium size utilities have implemented this change, but in smaller municipalities water and sewerage services are still operated by technical departments of the municipality. In rural areas there are a number of small water associations (altogether about 1,000) running drinking water services and in some cases also sewerage services. Most of these associations are water cooperatives, but some are private shareholder companies established under the private law.

Thus, in Finland private sector is not yet in a large scale owning or operating water and sewerage utilities. However, the cooperation between the public and private sector has been very wide in Finland. This is mainly related to outsourcing of various non-core services and goods from private companies. Outsourcing can form 40 to 90 % of the annual turnover of water utilities. Most common services outsourced are construction, planning and design, material/equipment supplies and laboratory services.

Yet, historically private sector has been involved also in actual service production in WSS in Finland. There have been concession contracts in some of the largest cities in the late 1800s and early 1900s, for instance in Helsinki. These concessions were, however, later terminated and the municipality retained the responsibility for water and sewerage services.

In England and Wales, water and sewerage utilities are currently entirely owned and managed by the privatised water and sewerage companies. The present organisational setting of the water sector in England and Wales was introduced in 1989, with the privatisation of the existing ten Regional Water Authorities (RWAs) in charge of water supply and sewerage. This organisational framework was the product of successive institutional and political rearrangements that took place since the early 1970s. In 1974, a radical reorganisation was carried out aimed mainly at rationalising and centralising a highly disintegrated public utility sector that had grown over a very long period of time.

As we have already seen, with privatisation, all functions related to water supply and sewerage were transferred to ten Water-and-Sewerage Companies (WaSCs), which replaced the RWAs in 1989, –with the exception of the 29 Statutory Water Companies, which had survived the 1974 reorganisation and were allowed to continue with some changes to their status as Water only Companies (WoCs) – while other duties related to the manangement of water quality and quantity, previously in the hands of the RWAs, were entrusted to the National Rivers Authority. The WaSCs were set up as the principal operating subsidiaries of the ten Water Holding Companies, the companies established under the 1989 Companies Act.

Under the Water Act 1989, the newly-floated WaSCs became owners of the entire water system and properties of the RWAs. Thus, the model of privatisation was a definite divestiture. The Water Act gave new WaSCs 25-year concessions for water supply and sewerage, protected against any possibility of competition. The concessions covered the whole of England and Wales, with the exception that 25% of the population continued to have their water (but not sewerage) supplied by the existing small private companies, now known as water-only companies or WoCs. Concessions may be terminated by the government, but only by giving 25 years' notice (extended from 10 years in 2002).

b) The relationship between local and central governments

In Argentina, after being centralized for decades in hands of a national monopolistic company (OSN), since the beginning of the 20th century, WSS services management became fragmented into national, provincial and municipal authorities as a consequence of this company's provincialisation started in 1980. This process resulted in a confuse decentralisation move, which gave rise to many provincial companies, as well as municipal services –often (completely or partially) delegated to cooperatives, especially in small cities– and may be considered as a preparatory step to this sector privatisation that took place in the early 1990s. Such decentralization, which was made too fast, without an adequate planning or any effort towards provincial and municipal capacity building, resulted in the absence of a real national policy concerning WSS services management, financing and regulation. As a consequence, the ultimate responsibilities for this sector management and regulation are now fragmented into many authorities from different levels whose actions follow different aims and strategies not linked between themselves.

This situation is aggravated by what we may call the structure of regulatory governance of Argentina, which is caracterized by a very a powerful National Executive, which may submit Congress to decisions taken under Urging Necessity Decrees, and a bounded federalism, in which the National state prevails over the provincial states and the municipalities, whose respective competences are not coherently linked in an integrated framework.

In Brazil, despite the net predominance of WSS services managed by (provincial) state owned companies, such public enterprises play the role of concessionaries of local services granted by municipal authorities. According to the country's Federal Constitution, which greatly reinforced municipal autonomy, the municipalities are recognized (as they were already before, even in the authoritarian times of PLANASA) as the conceding power or granting authority of all public services of "local interest", being free to decide whether or not to delegate their provision to private (or public) operators, either under concession or permission regimes regulated by contract, always through public auction. Although there is an adequate federal law of Concessions regulating fundamental aspects of this kind of contract, such as supervising, annulation and rescision conditions, as well as users' rights, there is still a regulatory gap regarding the definition of WSS services entitlement in metropolitain regions and conurbation, i.e., about which one of those government levels (provincial state or municipal) shall be recognized as the legal authority who has the power to negociate and sign concession or permission contracts with public or private operators. Although very active in planning, funding and policy formulation, Federal government remains mostly outside from operational activities in this field.

In Kenya, the local authorities have had a significant role in water supply and sewerage in some towns, although the central government has traditionally had the main responsibility also for service provision both in urban and rural areas. However, most of them need institutional reform and strong efforts on capacity building to improve their operational and commercial efficiency in other to develop services coverage and performance.

In England and Wales, the local government does not play any major role in water supply and sanitation. The central government is involved in regulation and control of the privatised water and sewerage companies in the following areas:

- Economic regulation of the water companies in England and Wales is carried out by the Director General of Water Services through his Office of Water Services (OFWAT). Other two regulatory bodies, the Monopolies and Merges Commission (MMC), and the Office of Fair Trading (OFT) have also important functions in relation to the water sector.
- Environmental regulation was entrusted at privatisation to the National Rivers Authority, which in 1995 was replaced by the Environment Agency. This latter has the duty to conserve, augment, redistribute and secure the proper use of water resources in England and Wales. It is the central body with responsibility for long-term water resources planning in England and Wales.
- Drinking water services quality regulation is carried out by the Drinking Water Inspectorate (DWI), which was created in 1990. DWI is responsible for assessing the quality of drinking water in England and Wales and its main task is to check the compliance of the water supply undertakers with the relevant quality standards. DWI is part of DEFRA, the Department of Environment, Food and Rural Affairs.

In England and Wales the strategic planning authorities and local authorities are responsible for the land use planning framework and planning decisions. Local authorities also regulate the quality of private drinking water supplies through their environmental health duties.

In Finland, the Constitution stipulates self-government for the municipalities and guarantees them a great deal of independence. As basic administrative units, they have also traditionally had a mandatory responsibility for providing welfare services. Municipalities are currently taking care of nearly two thirds of public services.

Thus, in Finland, the local government – i.e. municipalities – has been the body mainly responsible for water and sewerage services. The central government has always had only the facilitating and coordinating role, providing an "enabling institutional framework". The current Finnish national policies and legislation – based on the EU policies and strategies – consider all forms of ownership and organisational models for operational management of water and sewerage services equal. According to the current legislation, the water and sewerage undertakings and utilities are not public authorities, but (public) service producers.

Municipal water undertakings supply over 90 per cent of the total amount of water. Public water undertakings, owned by the municipalities and their water supply companies serve about 87 per cent of the population. The Water Services Act (119/2001) clarifies the liabilities of the municipality in WSS. Municipalities have the "responsibility for overall development and organising of water and sewerage services aimed at supplying a sufficient amount of domestic water for a good hygienic standard at a reasonable cost as well as proper sanitation from the viewpoint of environmental protection". Thus, the municipality is responsible for the overall development of water services within its jurisdiction. In practice, this means that the municipality has to make

water services development plans to cope with the municipality development. In accordance with the Water Services Act, the plans have to be maintained up to date. The municipality has to make the development plans in cooperation with the water and sewerage undertakings within its territory, and with the neighbouring municipalities.

c) The relationship between public authorities and private operators

In Argentina, the regulatory framework of WSS services involves two different relationships whose weight may vary accordingly to which government level is recognized as the conceding or licensing authority in each situation: the national, the provincial or the municipal one. Generally, all big scope concessions regarding services under national and provincial jurisdiction were preceeded by the creation of specialized regulatory bodies, formally independent from governments, which were charged of monitoring and enforcing contracts firmed by public authorities representing the respective executive power with private operators. In the operations involving concessions or partial delegations of WSS services under municipal jurisdiction the existence of independent regulators is very rare, the private operators (or cooperatives) being rather supervised by specific organs directly submitted to municipal governments. The institutional arrangements present in Argentina regarding the delegated management of WSS services may be characterized as a mixed situation which shows elements related to the French and the English regulatory traditions, acclimated to Argentina's political and institutional environment.

In Brazil, the relationship between the public authority playing the role of WSS services concessor or permissioner and the private operator, based mostly on contracts, is central to their regulation. In most cases, the municipalities are recognized as the granting power of local interest services, having cnsequently the right to decide whether to run directly their administration or to delegate their management to independent public or private operators, by means of concession or permission contracts, which shall always be granted through public auctions. But, as we said before, there is still a regulatory gap regarding the definition of WSS services entitlement in metropolitain and conurbation areas.

In Kenya, the central government has traditionally had the main responsibility for WSS services provision, although local authorities have also had a significant role in this field in some selected towns. At present, for providing water supply, local authorities have to apply for a water undertakership to the ministry in charge of water affairs. Only nine of them currently have such a mandate, while there are about 20 other Municipalities and 19 town councils, which do not have a water undertakership, but provide water services in their jurisdiction, as water distributors or by extracting water from small systems such as boreholes. A few local authorities have taken the initiative, under donor projects, to set up local utilities fully owned by them and expected to operate WSS services on a commercial basis. The Board of directors generally consists mainly of public officers, with a few representatives from the community served, and include the Mayor, Town Clerk, Town Treasurer, the Managing Director, representatives of MWRMD, MoLG and Minstry of Finance as well as representatives of business community, women and consumers.

As part of the Kenyan current water sector reform, some local authorities have recently established autonomous water and sewerage companies who manage WSS services. Under such reform, which aims at separating the functions related to planning,

operations and regulation, all the WSS services assets would be transferred to the Water Services Boards who would in turn contract with one or more water service providers to supply water in their jurisdictions. National authorities such as MWRMD would gradually get out from operational actitivities, being rather involved in financing, planning and regulating this sector.

In England and Wales, the central government does not play any role in WSS services provision, but is partially involved in regulation and control of the privatised water and sewerage companies, mostly in environmental and sanitary issues. On the other hand, in matters such as economic regulation and the regulation of services quality standards the most important role is played by OFWAT, the specialized and autonomous regulator created in 1989, which is formally independent from government. Local governments don't play any role in WSS services either, but rather an indirect role in their environmental regulation related to their duties regarding land use planning.

In Finland, as we have seen, there are many small private providers of WSS services for small rural and isolated areas whose assets are mostly owned by municipalities. Municipal authorities are in charge of licensing, supervising and giving technical support to such small systems. Water and Sewerage undertakers, which are not public authorities, may outsource most of their non core activities and are subject to different environmental and health regulations issued by municipal departments, as well as regional and central authorities too.

d) The relationship between operators and regulators

In Argentina, the formal independence of regulators created under the framework of big scope WSS services concessions does not correspond to great degree of real autonomy, as their role may be overwhelmed by discretionary actions of the executive power, as it happened with ETOSS and ERSACT respectively in the Greater Buenos Aires and Tucuman cases. It seems that the regulators, following the submission of political powers, were captured by the regulated companies whose interests prevailed in all contracts renegotiations which took place in both cases, especially on tariff issues.

In Brazil, where the privatisation of WSS services is still limited to concession and permission contracts granted mostly by municipal governments, the emergence of independent regulatory agencies is not common in this sector, nor even at the local level, contrastingly to what happened in fields such as electricity, telecommunications and transport, where this kind of agencies were created at national and/or provincial state levels. Although there is a national water agency (ANA), created by law in 2000, it is rather in charge of regulating water resources management national policy, not having at present any direct attribution related to WSS services. However, we may observe at municipal and provincial state levels different kinds of regulatory institutions involved in supervising, regulating and enforcing services under private management.

In our case studies, the concession of WSS services from Limeira and Niterói, granted by the respective municipal governments, are regulated by previously existent organs which were created for other purposes. In the first case, it concerns the former public provider, an autarchy which was converted into an organ in charge of services supervision and contract enforcement after the concession to the private operator took

place. However, as this autarchy kept its previous debts and had its personnel drastically reduced after privatisation, its real capacities to fill such duties were doubtful. Such situation changed after the agreement that took place in 2001between the Mayor and the concessionary, in which the latter accepted to assume part of the municipal autarchy's debts and to transfer to it 9.5% of the company's net income as a sort of regulatory tax, among other accepted requirements from the municipal government (as the creation of a social tariff), in exchange of increases on tariffs (which remained five years without being yearly updated, as stated in the contract).

In the case of Niterói, the municipal organ in charge of services supervision and contract enforcement is a public enterprise (EMUSA) dependent on public budget which was created long before privatisation for other purposes. Although such organ may be considered totally independent from the private operator, as it does not receive any kind of regulation tax based on the company's income, its real capacities to supervise services quality and to assure the contract enforcement seems to be a great challenge, as it was not properly enabled to fill such duties.

In the case of PROLAGOS, in which the granting authority is shared by the State of Rio de Janeiro together with five municipalities, all regulation duties were delegated to an independent and multi-sectorial regulatory agency (ASEP), created by law in 1997 at the state level specificly to regulate all the public services managed by private operators in which the Rio de Janeiro State takes part as concessor or permissioner. Although being financed exclusively by a regulation tax consisting of 0,5% of all the private concessionaries income, we may say that such agency is adequately structured to fill its duties without any major risk of capture by the political power or the regulated companies, as it has adequate financial and administrative autonomy assured by law, as well as a proper and trained personnel. This evaluation may be confirmed by ASEP's actions, as the agency has already summoned all the private concessionaries it regulates in every field (WSS, gas, collective transport and roadwoks), and have showed sufficient strength to preserve public interest in contract's renegotiations (as in the case of Prolagos concession).

In Kenya, new regulatory institutions are being build under the framework of af deep water sector reform involving WSS services as well as water resources manangement. Such institutions will be mostly based on regional Water Service Boards, whose general duties and functioning rules will be established at national level by the Water Sevices Regulatory Boards, while the disputes or conflics between the regulator, WSBs, water service providers and consumers will be arbitrated by the national and regional Water Appeals Boards.

In England and Wales, the creation of strong independent regulatory agencies at central level, as OFWAT for WSS services, is one of the cornerstones of the UK utilities privatisation policies, whose model was copied by other countries in the world. Originally, as we have seen, the independent regulatory agencies or commissions for public utilities were created in USA, being mostly regulated and controlled by Congress. In the case of UK, such control is different, as it is much more subject to political alternation related to the countries parliamentary government system.

In Finland, there are no independent and specialized regulators for WSS services, but rather a kind of endogenous regulation by local government elected authorities and municipal administration technical staff from different departments.

e) The relationship between operators and users

This comparative and analytical dimension of WSS services institutional dimensions is the most complex of them all. Yet, it is the one where we observe less differences between all the studied countries. In general, we may say that the water industry was historically organized in the developed countries under a supply-driven approach, by which government and/or private operators assumed all responsabilities towards water resources, drinking water supply and wasterwater, leaving to citizens a passive role as careless users of a cheap and "invisible" service. whose tariffs are often directly subsidized or kept below full costs recovery. Under the same "hygienistic" and productivistic approach, which led service managers to overexploit water resources in the developed world in unsustainable patterns, developing countries' water and sewerage utilities failed to ensure access to safe drinking water and sanitation services to the poorest. That is the reason why many researchers, multilateral agencies and policy-makers have been proposing a new demand-driven approach to water services and water resources management, at least since the mid 1960's, under diversified conceptions (water conservation oriented, citizen accountable or costumer responsive, i.a.) in different technical and political international forums (Cambon, 1996).

Although we may observe some formal traces of such new approaches in practically all of the studied countries (Customer Council for Water in England and Wales; Consumer Ombudsman in Finland; Consumer Defence laws in Argentina and Brazil; and the role of community based organizations and self help groups in water supply in rural areas of Kenya), a real customer-responsive approach for WSS services is not yet developed anywhere.[38] The most important point is that users' participation in WSS services management not in the passive role of consumers but as active co-responsible citizens or costumers is much more present in the discourse of public and private operators than in their real practices, because the formal existing participatory instances often have limited powers which may be put aside in the most important decisions, such as it happened in the concession of the water services of Greater Buenos Aires: the creation by ETOSS of an user's committee to support its decisions as a kind f advisory board inside its administrative organisation in 1999 never had any relevant impact on services regulation, as the regulator itself was progressively marginalised in the successive contract "renegotiations" which took place since 1994.

Off course, it is very important for all water utilities trying to assess and meet its costumers' needs and expectations in consistent ways, especially on issues regarding service levels and demand, which must be related with their respective ability and willingness to pay. For developing countries, a crucial issue concerning consumer's rights is the possibility of disconnection from service for unpayed bills. In all developing countries studied here, private operators have the legal right to proceed disconnections for non payment, despite the fact that the access to WSS services shall be seen rather as a collective need related to public health, instead of an individual right related to economic choices or capacities. Such consideration should be taken into account to legally forbid disconnection for non-payment, as well as pre-payment meters for WSS

[38] As stated by Seppälä et al. (2004): "Even those countries and utilities that are currently forerunners in customer orientation are still far from the highest steps of true customer-responsiveness" (p.90).

services, leaving private operators to pursue alternative strategies to recover or avoid unpaid bills. Unfortunatelly this matter is still absent from most developing countries legislation, being present only in England and Wales among our case studies.

Conclusions

After having described and compared policy, institutional and regulatory issues concerning WSS services in the five studied countries, we now attempt to answer the main questions raised at the beginning (p. 3), in the light of previous section's analysis. The whole set of our research questions may be summarized into three basic queries:

1. What does it mean to regulate a public utility service, and on whose behalf or interests is regulation made?
2. What are the main reference models for international and national policies aiming at promoting PSP on WSS services, and how they are being simply imitated or rather acclimated to new political and socio-cultural context in the implementation of water sector institutional reforms in developing countries?
3. What may be considered an adequate institutional and regulatory framework for WSS services, especially in the developing world?

However, instead of merely answering each isolated question in specific, we also aim at drawing general conclusions, trying to place all of our questions and answers under a unified conception of the general problem investigated here: what may be the adequate institutional and regulatory arrangements to assure social, economic and environmental sustainability to WSS services in developing countries, under the framework of policies oriented at promoting PSP, and how it may be politically built in democratic and transparent ways. As we see below, our overall response to such problem, as much as the answers we give to the specific questions above, is closely linked to the analytical and comparative dimensions we have examined before.

The first question above was already answered in section 2.2: regulation is made on behalf of public collective and social interests, which involve public health, environmental quality enhancement and preservation, as well as assuring basic living conditions to the poor as a social right. It means that public utilities as WSS services should be affordable and accessible to all citizens and families, independently of their income. This principle necessarily implies some kind of regulation of tariffs and profits, such as price cap and cost plus methods or/and social rates. But regulation is also made to prevent private investors from political risks, which requires many kind of legal and institutional arrangements that consolidate government's "regulatory commitment" to contractual rules, as independent regulators, legislation and contracts whose clauses recognize the right of private operators to maintain the economic and financial balance of the operations contracted with public authorities.

The second question was conceptually treated in section 2.3, where we discussed notions as social capital and path dependency to show how public utility policies are embedded in specific socio-political and cultural environments, as well as peculiar historical circumstances, not being easily transferable from one national/regional context

to another. Yet, our descriptive and comparative analyses developed in section 4 showed that there are very influential reference models of pro-market policies for WSS services being promoted by multilateral and external support agencies, mostly based on the French and the Anglo-American experiences (involving, respectively, concession and lease operations exclusively regulated by contracts and elected authorities on one hand, and specialized and powerful autonomous agencies and commissions in charge of regulating services fully privatized or delegated to private operators on the other). Such reference models seem to be more influential in highly urbanized Latin-American countries, such as Argentina and Brazil, than it is in Africa, despite the greater influence ESAs and donors are likely to have in policy formulation and reform in the countries of this continent, where geo-economic and socio-cultural conditions are radically different and specific to fit in any pure or acclimated model developed abroad.

Anyway, despite the recognizable influence and support of multilateral agencies such as the World Bank, we may say that in all developing countries studied here, no exogenous policy promoting PSP on WSS services was unilaterally implemented without passing through some kind of acclimatization, though not always to the benefit of users. Even in Argentina, where the neoliberal model of privatisation through big scope concessions to transnational companies promoted by the World Bank was implemented as a top-down policy, without public debates and with partial support of unions gathering ancient OSN workers (which were given a share of the privatized companies' stocks), under a deep economic crisis, the process was mostly guided by the central government directives and obscure interests, not always shared by the ESAs.[39]

In Brazil, although most privatisation policies developed under the Cardoso administration were also primarily guided by macro-economic aims related to fiscal adjustment and monetary stabilisation, the strong mobilisation of the country's important stakeholders related to WSS services, together with broader institutional constraints examined here before, impeded the full adoption of a national neoliberal policy in this field, where recent institutional changes have slightly promoted local services concessions and BOT contracts with great participation of domestic companies.

Finally, the overall institutional reform of Kenya's water sector is being developed since the late 1990s with the support of international cooperation agencies. However, it is clear that such reforms are not imitating any exogenous policy model, but rather seeking to build an institutional framework which takes into account the specific socio-economic, cultural and geographic conditions already involved in the supply of drinking water and sanitation services in the country.

So, we may say that the hypothesis of "donor dominance" does not entirely apply to the cases of pro-market WSS policies we studied here (i.e: mostly concessions to private companies in Argentina and Brazil, on one hand; and management contract operations and utilities commercialisation in Kenya, on the other).

The last question, regarding what may be considered an adequate institutional and regulatory framework for WSS services in developing countries, requires and overall

[39] In the case of the concession of Greater Buenos Aires' WSS services, e.g., the World Bank intended to have the license broken down to attain some degree of "competition by comparison", having unsuccessfully contested the decision of the National Executive Power to license the company, horizontally and vertically integrated, for 30 years.

response related to an integrated strategic vision of this sector development. Linked to the analytical framework we have proposed in section 3.3 and applied in our descriptive and comparative analyses carried out in section 4, such strategic vision may be formulated by means of some policy recommendations statements we develop below.

Considering our findings related to the first of our analytical and comparative dimensions, which deals with the relationship between public and private sector in the provision of WSS services, showing concrete examples of risks and opportunities involved in the promotion of PSP policies, with successful and failed experiences as well, we may recommend pragmatic pluralism and institutional flexibility as adequate directives for policy-makers in regards to this issue. It means recognizing that, although increased private sector involvement in WSS services must not be seen as an universal panacea to improve the social, economic and environmental sustainability of such utilities, which may be satisfactorily run in all of those aspects by public or community-based operators (such as in most of Finland's local services), it may nevertheless be an useful alternative strategy to overcome situations in which financial or/and management bottlenecks impede the services improvement and expansion under determined structural constraints (indebted and overstaffed services captured by political and corporative interests of rent seeking officers, without financial capacity or credit to invest; the need of large scale replacement of old infrastructures; a large growth on water demand related to uncontrolled and accelerated urban development; water scarcity related to long standing uncontrolled pollution of water courses; etc.), as long as such PSP promoting policy be provided of a proper institutional and regulatory framework making services management more transparent and democratically accountable to government and users.

With regard to our second analytical dimension, concerning the relationship between central and local governments in the field of WSS services, theoretical considerations about local government democratic accountability and our research findings suggest that policy decentralisation may be a good strategy to approximate services management to users/citizens needs and expectations.

However, we must also recognize that, in some cases, there are ecological factors and socio-economic pressures towards operational integration of local services in broader planning and management territorial units that appear in the most industrialized and urbanized river basins. In these regions, specially those where cities form metropolitan and conurbations areas, the pollution or saturation of closer water resources obliges public authorities [or private operators] to seek new sources of water in increasingly distant areas, which implies huge investments in water transport and treatment that surpass the financial capacities of isolated municipalities. In such cases, we may observe a sort of crisis of local solutions that may also touch sewage treatment and which requires regional cooperation, under different institutional arrangements involving all the municipalities and government levels concerned, to finance, implement and manage large scale supramunicipal infrastructures of water and sewage transport and treatment vertically integrated with municipal distribution and collection systems. Such kind of situation –which goes beyond urban waters, involving the need to plan the rational use of water resources by different human activities in an integrated approach at river basin scale– suggests that central governments must have an overall strategic and integrated vision of the whole water sector to guide any national policy aiming at decentralizing and democratizing its management. Otherwise, in the absence of such strategic vision, as it

happened in Argentina, decentralization policies may only serve to justify central government omission and jeopardize intergovernmental cooperation.

As concerns our other analytical dimensions, related to services regulation and users/citizens participation on their management, our findings suggest that any policy aiming at improving WSS services' social, economic and environmental sustainability, even those oriented to increase PSP in this field, must have a strategy based on social capital acknowledgement and enhancement, as well as on capacity building of local authorities. Regulation is such a crucial issue for the overall sustainability of WSS services, as well as for the viability of any PSP arrangement in this field, that it must not be left to specialized "independent" regulators which may be captured by private companies and governments own peculiar interest. Citizens and civil society organisations must also have mechanisms to supervise water services policies, including their management and regulation.

Finally, taking into account our previous considerations, we may conclude that an adequate regulatory framework for WSS services, especially for developing countries, must be a pluralistic and flexible (opened to changes) one, seeking to be customer-responsive, citizen accountable and oriented towards the universalisation of services and the protection and enhancement of a healthy environment.

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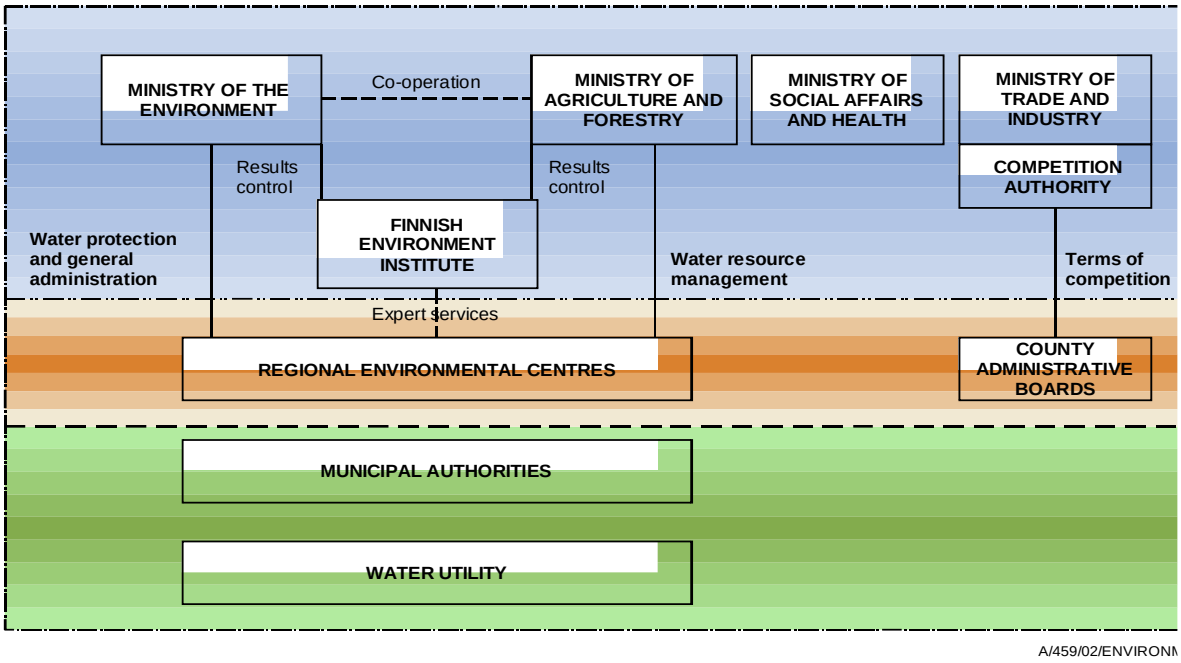
Appendix 1. Water and Environment Administration in Finland

Authorities in Finland responsible for water services can be classified as central, regional and local. Water resources management at the central level is the responsibility of the Ministry of Agriculture and Forestry (MAF) and the Ministry of the Environment (MOE). These ministries are in charge of water and environmental policy and strategy development, and legislation. Under these ministries the Finnish Environment Institute (FEI) operates as a national advisory body. Other national level key authorities with regard to water services are the Ministry of Social Affairs and Health (MOSAH) and the Ministry of Trade and Industry (MTI). MOSAH gives the guidelines for drinking water quality, and MTI through the Finnish Competition Authority currently regulates the economic activities and competition in the water and sewerage services sector.

At the regional level water and sewerage works are regulated and monitored by 13 regional environment centres which also are responsible for regional planning, monitoring and guidance in water issues within their area. The regional environment centres also oversee the implementation of the national policy and strategy in water services sector. In issues related to general administration and water protection due to waste water disposal, regional environment centres and FEI are responsible to the Ministry of the Environment, but in issues related to water resource management and water services they are responsible to the Ministry of Agriculture and Forestry.

At the local level, the municipalities are responsible for the provision, i.e. overall development and organization of water and sewerage services in their jurisdiction. The water and sewerage works are responsible for taking care of the production of water services, i.e. the construction of the water infrastructure, and operations and maintenance of services. The water and sewerage works also are in charge of the collection and conveyance of storm water and drainage water of the building foundations. The water and sewerage works are monitored and controlled by the municipal health protection and environment protection authorities, and by the regional environment centre. Figure Nº 4 shows the current administrative framework in Finland.

Figure Nº 4. Water administration in Finland



Source: modified from Vehmaskoski et al, 2002.

Appendix 2. Brazil's Water Resources Management Institutional Framework

A) Federal Level

In Brazil, water is considerated as a *public good*, which may belong to the Union (the National State) or the (subnational) Federated States, and whose abstraction is subject to a public license granted by Federal or State agencies, depending on which government level has the legal dominium over the source in question. The **Federal Constitution**, promulgated in 1988, establishes in its article 20 as public goods belonging to the Union "all the lakes, rivers and any running waters which are placed in federal lands, bathes more than one State, serve as part of national borderlines, goes through or come from foreign territory, as well as the riparian lands and fluvial beaches" (1st point), to which it adds the hydraulic energy potential (8th point). The same article assures that the States, the Federal District and the Municipalities will share a part of the income resulting from the exploitation of the hydraulic energy potential derived from water bodies within their territory (1st paragraph). On the other hand, the National Chart establishes as public goods belonging to the States all the superficial waters, shall it be running or in deposit (except the ones deriving from the Union's works) which are not in the previous situation, as well as all the underground waters (art. 26, point 1). Contrary to the preceeding Charts, it doesn't recognize private or municipal dominium over any waters. Finally, in its article 21, the National Chart established that the Union should create a *National System for Water Resources Managemen*t, as well as define criteria for granting rights to use it.

The latter constitutional article was regulated by the **Federal Law 9433**, promulgated in early 1997, which establishes the *Water Resources National Policy* and creates the **WR National System**. According to this law, the main principles of WR National Policy are:

1. water is a limited good which belongs to public dominium and has its own economic value;
2. its uses for human consumption and to quench animals thirst shall receive priority in any situation of scarcity;
3. WR management shall always proportionate the multiple uses of water bodies; be decentralised to provide de participation of public powers, users and communities; and be based on riverbasins as territorial units for planning and implementing the WRNP (1st art.).

WR National Policy's main objectives are to assure: 1) the availability of clean water to meet the needs of presente and future generations; 2) the integration and rationalization of multiple usages of water within the riverbasin targeting at sustainable development; 3) the prevention and defense against critical hydrological events deriving from natural causes or inadequate uses of natural resources (art. 2). Its implementation, which dependes on the WR National System organisation, is based on such tools as a) Water Resources Plans; b) licenses for water abstraction; c) a water use collection fee, which charges for water abstraction and effluents discharge on water bodies; d) compensations for municipalities facing land use restrictions related to the protection of water abstraction perimeters; and e) a Water Resources Information System

As per the WR National System – which is composed of a) the **National Council on Water Resources**; b) the **National Water Agengy** (ANA); c) the Water Resources Council belonging to each State plus the Federal District's one; d) the Riverbasin Commitees; e) the public organs from all government levels which have direct or indirect attributions related to water resources; f) the regional water agencies – , its main objectives are:

1. To coordinate the *integrated management* of Water Resources, including quantity and quality aspects as well as land use planification;
2. To arbitrate all conflicts related to water use at the administrative level;
3. To plan, to regulate and control the use of Water Resources, as well as to preserve and enhance their quality and availability;
4. To implement the WRNP and to promote the Water Use Collection fees (art. 32)

The **WR National Council** (CNRH) which has deliberative powers, is composed of representatives from: 1) the Ministrys and National Secretariats with attributions related to this mater; 2) State's WR Councils; 3) WR users; and 4) WR civil organisations. The number of Federal Executive Power representatives cannot exceed half plus one of CNRH's total members. Being directed by the Ministry of Environment, as its president, and the Chief of the **National Secretariat of Water Resources**, from the same portfolio, as its executive officer, its main attributions are:

- to coordinate and make compatible WR planning at national, state and regional levels;
- to arbitrate conflicts between WR Councils from different States;
- to decide about WR development projects which have repercussions that extrapolate the states where they will be implemented;
- to establish guidelines for the WR National Policy and working strategies for the WR National System ;
- to approve the constitution of new Riverbasin Commitees in rivers under the Union's dominium (federal rivers);
- to approve and to survey the implementation of National Water Resources Plan;
- to establish general criteria for the granting of water use licenses and for water use and discharge fee.

The **Riverbasin Comitees** concerning federal rivers, which have deliberative powers on their own jurisdiction, are composed of representatives from: 1) the Union, the States and the Municipalities whose territory is totally or partially located in the Commitee's jurisdictional area (made of one or more riverbasins); 2) WR users and related civil organisations established on its area. The number of representatives from eachone of those segments, as well as the rules for choosing them, may be established by each Commitee's own statute, but the global represention of public powers (i.e.: belonging to the executive branch of all government levels) must be limited to half of all its members.

B) Provincial States Level

Besides the National WR policy and system, most of States have their own ones, whose framework is generally similar to the national model (central and regional commitees, plus WR plans and funds) with some peculiar features. The Sao Paulo State, e.g. , has an "integrated, decentralized and participatory" WR Manangement System, created in 1991, which has greatly inspired the National one. In fact, the actual implementation of a WR management system at subnational level varies a lot from State to State, being very incipient, e.g., in Rio de Janeiro.

To facilitate the implementation of WR National Policy and the coordination of WR National System, the **law 9984** created, in mid 2000, the **National Water Agency**. It's a special body from the Environment Ministry, endowed plenty financial and administrative autonomy, whose main attributions are:

- to control, supervise, establish rules and evaluate the implementation of WR National policy;
- to grant rights to use WR placed under the Union's dominium by means of renewable temporary licenses
- to control WR uses and to support the creation of riverbasin commitees in water bodies under the Union's dominium;
- to prepare technical studies to subsidize the WR National Council decision about the unitary amount to be charged for water use and discharge fee, helping to implement it together with the Riverbasin commitees in water bodies under the Union's dominium;
- to collect, allocate and apply resources deriving from the water use and discharge fee collected in water bodies under federal dominium;
- to organise, implement and manage the National WR Information System.

ANA's most important project is PRODES, which intends to reduce the organic pollution of rivers via subsidization of waste water treatment by WSS operators. Instead of financing works and equipments, ANA pay for results, monitoring the quantity and the quality of treated effluents.

Appendix 3. Synoptical Tables On Comparative Analysis Of Psp In Wss Services In Selected Countries

A) Table Nº 4. Relationship between Public and Private Sector and between Central and Local Governments

COUNTRIES	DIMENSIONS OF PSP ANALYSED AND COMPARED	
	RELATIONSHIP BETWEEN PUBLIC AND PRIVATE SECTORS	RELATIONSHIP BETWEEN CENTRAL AND LOCAL GOVERNMENTS
U.K. (England and Wales)	WSS utilities are entirely owned and managed by the privatised water and sewerage companies (since 1989).	Central government does not play a major role in WSS provision, but is involved in regulation and control of the privatised water and sewerage companies.
FINLAND	Public sector predominantly responsible for WSS services. Utilities mainly owned by municipalities. Autonomous municipal enterprises. Outsourcing of non-core services and goods from private companies (40-80 % of turnover).	Municipal self-government defined in Constitution. Municipalities have the main responsibility for WSS services and own utilities. Central government has a policy making and facilitating role.
ARGENTINA	Since early 1990s, multinational and domestic private operators have managed many large urban water and sewerage systems under long-term concession contracts. Most of these contracts have raised some conflicts and their success/failure has been debated a lot.	Being formally a federal state, the provincial governments have a considerable degree of autonomy and decision-making power in areas such as WSS services management, especially after the decentralisation of the former National Sanitation Company (OSN) in 1980.
BRAZIL	According to the country's Constitution, "it is in charge of the Public Power directly or through concession or permission regimes, always through public auction, to assure the provision of public services." It means that full divestiture is forbidden. Around 60 municipalities have signed concession or permission [BOT or management] contracts with private companies since 1995. The current government does not specifically favour WSS privatisation, but PPPs are encouraged.	Brazil is also a federal state where the provinces (federated states) and the municipalities have a high degree of autonomy, especially after the promulgation of the Federal Constitution in 1988. According to this Chart, the municipalities are the granting authorities responsible for public services of local interest (as WSS). From the early 1990s, started a transition from a state centralised and de-concentrated WSS services management model,

		based mostly in provincial companies, to decentralised and "flexible" model.
KENYA	The capacity and role of private sector has earlier been very limited in WSS provision in Kenya. Community-managed water systems in rural areas. Water sector reform proposes for a bigger role for private sector. Private Water Service Providers are encouraged, but currently local private potential is low.	Local authorities have (had) a significant role in WSS in selected towns, although the central government has traditionally had the main responsibility for service provision. As part of the water sector reform local authorities have established autonomous water and sewerage companies who manage WSS services.

B) Table Nº 5. Relationship between Public Authority and Private Operator and between Private Operators and Regulators

COUNTRIES	DIMENSIONS OF PSP ANALYSED AND COMPARED	
	RELATIONSHIP BTW. PUBLIC AUTHORITY AND PRIVATE OPERATOR	RELATIONSHIP BTW PRIVATE OPERATOR AND REGULATORS
U.K. (England and Wales)	There is no direct relationship between government and private operators, whose activities are mostly regulated by specialized autonomous agencies. But central government has great powe to change the rules of the game.	Private operators' technical and financial performance is regulated and monitored by independent regulatory agencies.
FINLAND	Services provision based on the responsibility of the local governments. The municipalities have constitutional autonomy and the possibility to design services' production and management according to what their democratically elected government considers to be best. In any case, regulation is controlled by local and central governments.	There are no independent and specialized regulatory agencies for WSS services, but rather the intervention of local, regional and national governmental organs to regulate drinking water quality, as well as health and environmental issues related to such services.
ARGENTINA	National, provincial and municipal authorities may play the role of the granting power, which decides when and how to delegate services management and provision to private operators, always based on contractual rules.	There are national and provincial independent regulators responsible for regulating and monitoring private operators technical and financial performance, but the regulatory framework is instable and fragmented.
BRAZIL	Provincial and municipal authorities may play the role of the granting power, which decides when and how to delegate services management to private operators, always based on contractual rules.	There are provincial and municipal organs dedicated to regulate and monitor private operators technical and financial performance, whose general status is variable in regards to the degree of independency from governments and specialization.
KENYA	National authorities are ultimately responsible for services regulation and provision, which is shared by local authorities and small formal and informal private providers.	Regulatory agency established at the central level 2004 (Water Services Regulatory Board, WSRB), but it is under the Ministry of WRMD. There are plans to create regulatory agencies also at regional level.

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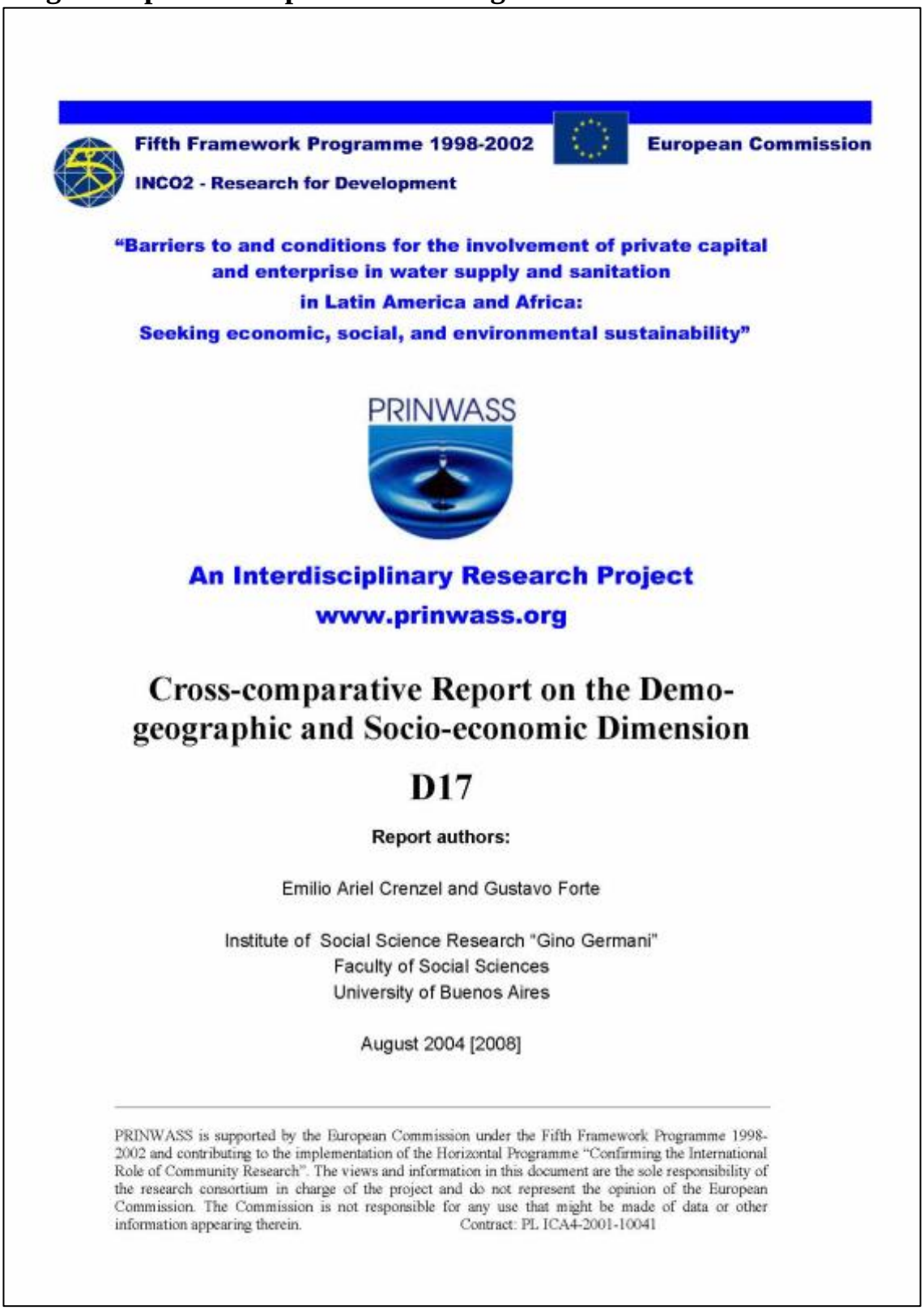

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Cross-comparative Report on the Demo-geographic and Socio-economic Dimension

D17

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ARTICLE 4

Cross-comparative Report on the Demo-geographic and Socio-economic Dimension

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Introduction

This comparative report addresses the demo-geographic and socio-economic characteristics of the cities chosen to carry out the case studies. The study constitutes an important component of the contextual framework developed for the comparative analysis of private sector participation (PSP) in the management and provision of water and sanitation services (WSS). This effort to integrate the analysis of demo-geographic and socio-economic processes in the assessment of WSS is highly relevant given the increasing centrality of targeted actions to tackle the conditions of water inequality and poverty affecting large shares of the global population, as expressed in the UN Millennium Development Goals (MDGs) and in the strategies of the International Financial Institutions (IFIs), donors, governments, and NGOs, whereby the inclusion of policies to foster "social cohesion" in the national strategies and development processes has become paramount.

In this connection, the objective of the document is to identify and analyse some of the key similarities and differences observed in these locations and developing a provisional classification of their urban profiles and varying social conditions. The first step consisted in the elaboration of a provisional classification in three categories based on the size of the cities involved: large metropolises, medium-sized cities, and small urban centres. The results were controlled by also analysing the relative weight of the each city's Gross Domestic Product (GDP) within the Gross National Product (GNI). This initial classification allowed us to cluster the cities by identifying a series of similar demographic processes associated with different population sizes. For instance, large metropolises tend to share certain common trends with regard to demographic stabilisation, the concentration of a significant proportion of one-person households, the movement of the well-off sectors to the suburbs, and the considerable weight of economically active and retiring age groups within the population. We also found that medium-sized cities are undergoing a process of increasing metropolization as they receive strong migratory movements and continue to integrate peri-urban spaces and surrounding towns and villages. These cities tend to have a remarkably young population,

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a characteristic that tends to reinforce their condition as developing urban centres, and accommodate a large proportion of multi-family households.

The next step was to cross this initial classification with a number of basic socio-demographic variables, such as sex and age distribution, population density, and living conditions, which cast a much richer comparative picture regarding urban and social development trends that may affect the conditions for success and failure of PSP projects in the provision of WSS. Among other crucial findings it is worth highlighting some characteristics and patterns that are shared by all cases, like the increasing environmental degradation affecting peri-urban areas where the poor are concentrated. Access to drinking water and sanitation services is very difficult in these areas, which is compounded by the weak integration of these territories in the activities of urban planning and management. As a result, it is possible to identify an increasing social and spatial polarization of the population in relation to the basic living standards associated with modern urban life, and particularly the differential access to drinking water and sanitation and other essential goods and services.

An important conclusion derived from the study is that these trends represent a crucial constraint for the implementation of the WSS programmes based on the promotion of PSP examined by this project. Increasing socio-economic inequalities, poverty, deprivation, and spatial segregation hinder the possibility of success of for-profit private sector providers, who don't find particularly attractive supplying WSS to the poorest sectors of the population. These sectors usually cannot afford paying for WSS services at the rates needed to make the system profitable for multinational private corporations, which in addition are very reluctant to invest in the expansion and maintenance of the networks in poor areas owing to the high financial risk involved. These findings are consistent with the conclusions of other studies, and the problems identified are increasingly recognized by the main promoters of PSP expansion in the water sector and also by the multinational water utilities that have been at the forefront of these policies.[3]

This comparative study allows the identification of common problems and challenges affecting the cities included in the research by looking both at inter-city and intra-city heterogeneities in terms of their demographic and socio-economic characteristics. While inter-city differentiation is often associated with scale, intra-urban cleavages are often the result of acute social polarization, which in the case of WSS is expressed in differential patterns of access to the services, in particular problems of coverage, affordability, and service quality. In short, the report aims at dissecting the urban complexity in the cities studied from a perspective that gives centrality to the trajectories, dynamics and main trends characterizing the demographic and socio-economic processes not just as contexts of WSS policies but as structural components that underscore much of the challenges and opportunities facing the provision of these services. In this regard, Chapter 2 provides a characterization of the cities by looking at their historical development, population size and urban dimensions, sex and age profiles, and spatial distribution of the population, exploring how these variables are associated

[3] See Castro, 2016, and Azpiazu and Schorr, 2016, Articles 1 and 2 in this publication. The World Bank has recently recognized that "private providers fail to reach the very poor" (World Bank, 2004: 8), and global private water companies have started to recognize this fact as well.

with the problems of access and use of WSS. Chapter 3 provides an analysis of the socio-economic dimension by addressing the distribution and characteristics of aggregated variables like Gross Domestic Product (GDP) and Gross National Income (GNI), the diversity of economic structures characterizing the cities, and their different profiles in terms of employment patterns, unemployment, poverty, income distribution, and water-related health problems. The report is closed with a brief section summarizing the main conclusions of the study.

Demo-geographic trends[4]

This section is concerned with the interrelation between urban and demographic change and water resources and services. In this regard, although there is an increasing interest in the study of how the socio-economic structures, socio-cultural traditions, and institutional frameworks are related to the particular dynamics observed in the management of water resources and WSS in different settings (Walton, 1993), the relationship between urban change, urban forms, and water use has been largely neglected in the debates surrounding mainstream policy programmes in the fields of water resources and WSS. A possible explanation for this relative neglect may be that isolating the impact of urbanization processes on water management activities is more difficult than, for example, specifying the impact of institutional, technological, or financial factors such as pricing, the cost-benefit efficiency of technologies, or water industry performance. In contrast, the "background" relationship between urban form, urban change, and water management has received less attention (METRON, 2000).

Also, in relation to demographic processes, there has been a tendency in part of the literature to adopt mechanistic and linear perspectives whereby the management of WSS is associated with the process of demographic expansion with disregard for the historically specific social and cultural configurations of the population units. This type of approaches has informed the recurrent predictions of uncontrollable increases in the water use, ensuing pressures on water resources and the consequent deterioration of the environment (Pedregal Mateos, 1995). Without denying the mounting evidence about the process of environmental degradation associated, for instance, to uncontrolled overpumping and overall mismanagement of water resources, it is crucial to qualify the often sweeping conclusions by paying more attention to the neglected historical, social and culturally specific nature of these processes. Moreover, more attention should be paid to the interrelations between water resources management, WSS, and the internally differentiated profiles of the population units in terms of their socio-economic characteristics, social cohesion, and normative systems (Rayner and Malone, 1998).

In this connection, from our perspective the analysis of present trends and future scenarios in relation to the challenges and opportunities facing PSP programmes for the provision of WSS in urban areas requires the inclusion of socio-demographic processes and trends into the equation. We also argue that the analysis must pay particular attention to the socio-economic characteristics of the population, the internal patterns of structural

[4] This section by Emilio Crenzel.

differentiation, and the concrete expressions of these aspects in the social structuration of the urban space. The analysis of these factors may not only contribute to a better understanding of the opportunities and obstacles facing PSP in the WSS sector, but more importantly may also provide valuable knowledge for the assessment of the possibilities and conditions for service expansion, prevention of further social segregation in the access to WSS, and improvement of the deteriorating water environment.

The urban profile

Rapid urbanization characterized by large population increases and spatial expansion of the urban environment as a result of the concentration of economic activities in cities continues to underscore the main demo-geographic trends, especially in developing countries. While in 1800, only 5 percent of the world population lived in cities, in 1900 this proportion was 15 percent, in 1950 25 percent, in 1980 40 percent and towards 2025, 60 percent of the world population will be localized in cities.[5] However, the urbanization process is characterized by high heterogeneity, as illustrated by the classification of our case studies in relation to their population size (Table Nº 1).

[5] See Appendix, Table A1; and Mc Michael (1993) and Dogan and Kasarda (1988). In Latin America the urbanization process is taken place at a faster pace, and by the year 2000 this was the most urbanized region in the world. According to some estimates by 2015, 80% of the Latin American population will live in cities. See Ledo (2002).

Table Nº 1. Case study cities by population size

City	Population
Buenos Aires, Argentina (2001)	11,453,725
London, England (2001)	7,188,000
Athens, Greece (2001)	3,187.734
Dar es Salaam, Tanzania (1999)	2,497,940
Tucumán, Argentina (2001)	697,936
Aguascalientes, Mexico (2000)	643,419
Cochabamba, Bolivia (2001)	517,024
Niterói, Brazil (2000)	459,451
Lakes Region,[6] Brazil (2000)	403, 418
Resistencia, Chaco, Argentina (2001)	365,637
Limeira, Brazil (2000)	249,046
Nyeri, Kenya (2001)	120,540
Lahti, Finland (2003)	98,000
Kangasala, Finland (2003)	23,000
Tala, Kenya (1999)	22,375
Lapua, Finland (2003)	13,000
Nurmo, Finland (2003)	11,000
Kauhava, Finland (2003)	8,000
Kuortane, Finland (2003)	4,000

This distribution of the case studies allows us to identify a clear pattern with three main categories: large metropolises, medium-sized cities, and small urban centres. The metropolises are usually well consolidated urban centres concentrating the main economic, financial and industrial activities of their countries, characterized by dense chains of social interaction and high level of opportunities. Some of them have been termed "world cities" and "open areas" because of their status as national capitals and nodes of international networks between their countries and the world market. The second group in our cases is composed by medium-sized cities, normally provincial capitals closely related –as a trend– to primary economic activities, most of which underwent a rapid process of urbanisation during the second part of the twentieth century. Finally, the third group is composed by small cities and little towns.

Regarding the group of large urban centres, the Buenos Aires Metropolitan Area, comprising the country's capital Buenos Aires and a conurbation composed of 24 districts falls into the first category, housing 31.6 percent of the country's population (INDEC, 2002). The conurbated districts concentrate 76 percent of the metropolitan population and 24 percent of the country's total. The second largest among our cases is London, one

[6] Includes the municipalities of Arauama, Saquarema, Silva Jardim, Armação dos Búzios, Arraial do Cabo, Cabo Frío, Iguaba Grande and S. Pedro da Aldeia.

of the main metropolises in the European Union and one of the most densely populated cities in the continent after Brussels and Paris. Within Greater London, Inner London concentrates 2.77 million people and Outer London, 4.41 million (2001). Buenos Aires and London share a significant common trait: they are port cities that achieved pre-eminence by connecting their national territories to the world market. London, of course, became the very centre of the world market and, despite the fact of being surpassed by the emergence of other global centres still retains strategic importance as one of the world's financial centres. In different degrees, in both cities the process of commercial and industrial expansion was largely connected with their character of "open areas", simultaneously national capitals and connecting nodes of international markets (Smailes, 1971: 1-14). In this sense, their emergence as large metropolises was from the very beginning closely intertwined with global social processes.

Athens, located in the Attica region in the south-centre of Greece, is also a port city and houses around 40 percent of Greece's population. In some respects it is also a "global city", taking into account its access to material and symbolic goods as one of the capital cities in the European Union and also because of its millennial tradition as an strategic urban centre. However, during most of the 19th century Athens was merely a small settlement lacking in significant industries, and mainly concentrating administrative functions (Burgel, 1981, quoted in Kallis and Coccossis, 2003). To a large extent, its revival as a world metropolis is a relatively recent phenomenon that can be dated to the second half of the twentieth century, when it became the industrial and services' centre of the country. Finally, Dar es Salaam in Tanzania, located on the Western coast on the Indian Ocean. Although the city formally lost its place as capital city, it still concentrates the main administrative and commercial activities and is the country's largest urban centre concentrating 11 percent and 25 percent of the total and urban population of the country respectively.

The second category is a diverse set of medium-sized cities with population numbers ranging from around 250,000 to 1 million people. The group comprises four provincial capitals: San Miguel de Tucumán, capital of the Province of Tucumán, Resistencia, capital of the Province of Chaco, both in North-western Argentina, Aguascalientes, capital of the state of Aguascalientes in Mexico, and Cochabamba, capital of the Department of Cochabamba in Bolivia. It also includes the Brazilian cities of Limeira in the state of Sao Paulo, and Nitéroi in the state of Rio de Janeiro, and the municipalities of Arauama, Saquarema, Silva Jardim, Armação dos Búzios, Arraial do Cabo, Cabo Frío, Iguaba Grande, and S. Pedro da Aldeia in the "Region dos Lagos" located in Rio de Janeiro State.[7]

San Miguel de Tucumán, Cochabamba and Aguascalientes are old colonial cities founded in the 16th century. Tucumán's early expansion was related to the trade of mules and goods with the Alto Peru Viceroyalty, whose capital city was in Lima. Since the beginning of the 19th century the city's benefited from the development of a successful cane sugar industry. Cochabamba's main activity has always been agriculture, as it provides food to the mining city of Potosi. Aguascalientes stands out for the production of fruit, and is one of the leading national producers of guava apples and exporter of

[7] See Llop and Bellet, 2000: 335-339, and Jordan and Simioni, 2000: 159. About the development of middle cities in Latin America, see ECLAC, 2000a, 2000b.

frozen vegetables. Niterói was named after the name of an old aboriginal settlement which etymologically means "hidden waters" in Tupi-Guarani, a reference to the scarcity of surface fresh water streams in the area. The city is located on the right side of the Guanabara Bay in the state of Rio de Janeiro, and was the state capital until 1975.[8] Today it forms part of the Rio de Janeiro Metropolitan Area, which currently encompasses 17 municipalities, and its main economic activity is the naval industry. Limeira, on the other hand, is located in the state of Sao Paulo and was founded in the 17th century as a transit area for commuters between the capital of the state and Mato Grosso, and therefore the city became an attractor for commercial activities and a crucial link between primary and industrial production in the two regions. In political-administrative terms, the municipality belongs to the region of Campiñas, the second metropolitan area of the sate, which in turn, encompasses seven governmental regions. Limeira has a very dynamic economy based primarily on agricultural and industrial production of orange juice, sugar and alcohol, as well as other food products, paper and cellulose, among others. Also, the localities of Cabo Frio, Búzios and Arraial do Cabo in the Lakes Region are important destinations for national and international tourism during the summer season. This second group of urban conglomerations have experienced similar processes of rapid urbanisation during the second half of the twentieth century, which resulted in a twin process of metropolization and simultaneous decrease of the rural population in the surrounding áreas (Valladares and Prates Coelho, 1999).

The third group is made up of small urban villages with no more than 120,000 inhabitants. The cities of Nyeri and Tala, located in the central province of Kenya and the young Finnish localities of Lahti, Kangasala, Lapua, Nurmo, Kuortane and Kauhava fall into this category. The latter were set up between 1865 and 1905 in the southern region of Ostrobotnia in the west of Finland (Äikäs, Juuti and Katko, 2003). However these cities show very diverse and contrasting living conditions. In the case of Kenya, the population is predominantly rural (65 percent), while over 60 percent of the urban population lives in unplanned (slum) settlements. In the case of Tala, for instance, there is no public sewerage system and the residents depend on pit latrines (92 percent) and septic tanks, while the households tend to be overcrowded with an average of 4.52 persons per housing unit. In contrast, the population of the small Finnish cities enjoy very high living standards, derived from their strong productive structures combining an important manufacturing sector, a well-developed and specialized services sector, and urban modern infrastructure.

[8] Since the declaration of the Republic (1889) until early 1975, Niterói was the capital of Rio de Janeiro state, which didn't encompass the city of Rio de Janeiro. The latter, as the capital of the Federal Republic of Brazil, represented the "neutral territory" of the Federal District. The transfer of the federal capital to Brasilia in 1960 led to the creation of the state of Guanabara, comprised solely by the city of Rio de Janeiro. However, on 15 March 1975 the State of Guanabara was incorporated into the state of Rio de Janeiro and the city of Rio de Janeiro became the state's capital.

Gender and age distribution

The description and analysis of the sex and age structures of the population in the cities studied is aimed at testing the consistency of the first classification by population size. Also, these basic demographic variables can be used as "proxi" indicators to account for the heterogeneous profiles of the population in relation to the access and use of WSS. In turn, differences between age and sex groups underscore differential experiences –and indeed different cultures– in the daily use of WSS. The analysis of the dynamics and trends of these indicators may contribute to forecast the likely characteristics that could be assumed by the future demand for WSS.

Table Nº 2. Gender Distribution in the case studies (% of the total population)

Case Study	Male %	Female %	% Difference Males/Females
Dar es Salaam, Tanzania (2002)	51.0	49.0	2
Kuortane, Finland (2003)	50.5	49.5	1
Nurmo, Finland (2003)	50.0	50.0	0
Municipalities in the Lakes Region, Brazil (2000)	49.9	50.1	-0.20
Lapua, Finland (2003)	49.6	50.4	-0.80
Limeira, Brazil (2000)	49.6	50.4	-0.80
Kangasala, Finland (2003)	49.3	50.7	-1.40
Kauhava, Finland (2003)	49.2	50.8	-1.60
Tucumán, Argentina (2001)	49.1	50.9	-1.80
Tala (Kenya) (2001)	49.0	51.0	-2.00
Athens, Greece (2001)	48.9	51.1	-2.20
Nyeri, Kenya (2001)	48.7	51.3	-2.60
Buenos Aires conurbation, Argentina (2001)	48.4	51.6	-3.20
Resistencia, Chaco, Argentina (2001)	48.4	51.6	-3.20
Aguascalientes, Mexico (2000)	48.3	51.7	-3.40
London, England (2001)	48.0	52.0	-4.00
Cochabamba, Bolivia (2001)	47.8	52.2	-4.40
Lahti, Finland (2003)	47.0	53.0	-6.00
Niterói, Brazil (2000)	46.6	53.4	-6.80
Buenos Aires (City), Argentina (2001)	45.5	54.5	-9.00

Source: National censuses (see References)

Beyond the first impression provided by this quantitative distribution, the association between the gender roles in the tasks of collecting, transporting, using and consuming water varies according to the cultural values prevailing in these cities. For

instance, in African cities a large proportion of women are in charge of collecting and transporting water for consumption and use in the household, which demands a high proportion of their time and jeopardizes their chances to obtain employment or develop other important activities. However, this unequal gender relationship follows an inverted trend when we consider the structure of responsibility in the institutional bodies in charge of water management, where women are largely underrepresented. In general, these gender inequalities in relation to WSS are just starting to be discussed.

From another angle, the first typology ordered according to population size also breaks down when the age distribution is taken into consideration. In this regard, both little towns and large metropolises show a higher proportion of population in the middle and high age groups and a smaller proportion of the younger group (Table Nº 3).

Table Nº 3. Age Distribution in the case studies (% of the total population)

CASE STUDIES	AGE GROUPS (%)		
	0-14	**15 A 64**	**65 AND MORE**
Buenos Aires, Argentina (2001)	16.7	**66.2**	**17.1**
Buenos Aires conurbation, Argentina (2001)	26.9	**63.2**	**9.8**
London, England (2001)	20.2	**65.4**	**14.4**
Athens, Greece (2001)	18.1	**68.8**	**12.8**
Dar es Salaam, Tanzania (2002)	33.0	**75.0**	**2.0**
Tucumán, Argentina (2001)	**31.8**	60.8	7.5
Aguascalientes, Mexico (2000)	**36.6**	58.5	4.4
Cochabamba, Bolivia (2001)	**33.1**	61.5	5.4
Niterói, Brazil (2000)	**29.1**[9]	57.2	13.7[10]
Resistencia, Chaco, Argentina (2001)	**36.0**	57.8	6.1
Limeira, Brazil (2000)	**36.0**[11]	55.1	8.9[12]
Nyeri, Kenya (2001)	**37.9**	56.8	5.2
Municipalities in the Lakes Region, Brazil (2000)	**41.0**[13]	50.0	9.0[14]
Lahti, Finland (2003)	15.9	**68.2**	**15.9**
Kangasala, Finland (2003)	20.4	**66.8**	**12.8**
Lapua, Finland (2003)	18.3	**63.0**	**18.7**
Nurmo, Finland (2003)	23.9	**66.8**	**9.3**
Kauhava, Finland (2003)	18.2	**63.4**	**18.4**
Kuortane, Finland (2003)	15.9	**61.4**	**22.8**

Source: National censuses (see References)

This profile, especially in the metropolises, can be explained by the termination of the process of demographic transition, and by the attractor of better living conditions, greater opportunities in the labour market, and wider choice for the access to amenities characterizing large urban centres. The significant proportion of an ageing population is

9 0 to 19 years old.

10 60 years and over.

11 0 to 19 years old.

12 60 years and over.

13 0 to 19 years old.

14 60 years and over.

also an indicator of rising needs for specialised and costly health services in these conglomerates. In the case of Buenos Aires, for instance, this age group is largely composed by people living on a very small pension and exposed to conditions of social vulnerability and risk given the poor conditions of state services. The available evidence shows that this age group is experiencing difficulties in meeting the cost of the public utility bills, which has significantly increased as a component of the total household expenses during the 1990s (see ECLAC-UNDP, 1999; Arza, 2002: 48.).

In contrast, in the medium-sized cities –and also in the suburban areas of Buenos Aires and Dar es Salaam–, there is a trend towards a higher proportion of younger population (under 14 years) and, with the exception of Niterói, a smaller presence of the older groups. Therefore, these cities have a higher share of their population in a situation of demographic dependence[15] given the weight of the young population (under 14 years old) and older groups vis a vis the economically active population. These indicators also relate to the rapid development undergoing these cities not only in urban terms but also in age terms, which points to growing investment requirements ahead in order to include these groups in the labour market and provide them with access to essential services like WSS.

Summing up, the differential age structures of the cities are related to their historical demographic development, the prevailing living standards, and their diverse trajectories in terms of economic development and the role that these cities play within the political and institutional configurations of their respective national societies. In turn, many of these cities –especially the large metropolises and other important centres– are characterized by high internal heterogeneity regarding the demographic and social profiles characterizing different sectors of the population, to the extent that there is often a stronger association between the indicators corresponding to urban areas belonging to different cities than between, for instance, between those corresponding to the peripheral areas and the average conditions prevailing in the same urban space.

Demographic growth and structure

As regards demographic growth trends, it has been already noted that the large metropolises have completed the demographic transition whereas in the medium-sized cities this is an undergoing process. However, beyond this first differentiation it is possible to identify a much more complex dynamic between and within these groups of cities, which is related to their migration patterns associated with economic and political processes, global fertility rates, natural birth rates, and household structure. On the one hand, although the large metropolises follow a general trend towards demographic stabilization, in the European cases this trend is counterbalanced by foreign migratory inflows and the higher birth rates of the ethnic minorities. Also, in the case of Dar es Salaam growth rates continue to be very high. Beyond these overall trends, the cities have a high degree of internal differentiation regarding natural population growth, with very different patterns observed between the well-established urban areas and other sectors

[15] mographic dependence indicates the proportion of children and the elderly in relation to the economically active population.

such as the peripheral settlements in developing country metropolises where the population growth rates are well above the cities' average. On the other hand, intermediate cities have a much more recent process of demographic stabilization resulting from the net reduction in the natural growth rate of the population. Nevertheless, these cities are undergoing a process of metropolization as a result of rural-urban migration and the expansion of the urban area through the incorporation of neighboring towns and cities, thus increasing their population in both absolute and relative terms.

In Argentina, the Federal Capital presents a stable demographic path as a result of a low birth rate combined with high longevity since the 1950s, maintaining a relatively constant population of around 3 million people.[16] In contrast, the conurbated area experienced fast demographic growth as a result of industrialisation between the 1940s and 1970s. The natural growth rate of the greater Buenos Aires was four times higher than the national average between 1947 and 1960, and three times higher between 1960 and 1970. The pace of demographic expansion slowed down during the 1980s and during the 1990s the population growth rate of this area got closer to the national average of 11 percent. The new demographic pattern was due to the rapid de-industrialisation process, which stopped the flow of labour to the region and worsened the overall living conditions. Nevertheless, inside the Greater Buenos Aires the periphery where the poor tend to concentrate continued to experience a very fast demographic expansion during the 1990s, with growth rates ten times higher than those observed in the areas closer to the capital (INDEC, 1993: 28, 31; INDEC, 2002: 26-28). These are jurisdictions concentrating a large population, mostly poor population affected by employment problems, low income, and lack of access to essential public services including WSS. Most of these sectors are located within the area covered by the private concession in hands of the company Aguas Argentinas (AASA). Also, another important indicator of intra-urban inequality is observable in the patterns of household structure: while in the capital city single person households account for 26 percent of the total, the proportion drops to 9 percent in the conurbated area; in turn, family households represent respectively 72 percent and 87 percent of the total in both sections of the metrópolis (INDEC, 2002).

London underwent a more irregular process: the population grew steadily between 1920 and 1939, with rates three times higher than the national average, but since the Second World War there was an inversion of this process and the city continually expelled population, especially during the 1960s and 1970s. As a result of economic recession, between 1971 and 1981 the population fell a further 18 percent, but it has been growing again ever since and currently concentrates about 12.2 percent of the population of England and Wales (2001). The particular composition of the population, with a large proportion of people in the younger groups translates into a low number of persons per household (2.3 in 2001), and the proportion of one person households made up about 35 percent of the total in 2001, five percentage points higher that national average (Focus on London 2003: 16).

However, in comparative terms there are important differences between London and Buenos Aires in the characteristics of the demand and consumption of WSS among

[16] The capital was the target of internal migration movements since the 1930s, and in 1991 23% of the population was composed by migrants from the interior of the country. However, during the 1990s the city lost 200,000 people.

the elderly, the single-person households, and the impoverished sectors of both cities. For instance, in Buenos Aires the elderly living in single-person households compose a sector of the population with increasing economic difficulties to afford the payment of essential services, including WSS, while in London the same age group tends to enjoy higher living standards and are in a better position to afford for the payment of essential services, including WSS. In the poorest sectors of the Greater Buenos Aires area, the increase of multi-family households has triggered a higher consumption of WSS in absolute terms, although the per capita consumption in these households is lower than in the single-person households. Moreover, many of these households do not have access to networked WSS and given their low capacity to afford paying for the services the private company has no interest in expanding the coverage, given the unlikelihood of recovering the investments, the difficulties involved in the maintenance of the infrastructure in these areas, and the obstacles to the collection of the service charges.[17]

In the case of Athens, the city doubled its size as a result of the expulsion of the Greek population from Asia Minor by the Turks in 1922 (Coccossis and Schubert, 1991). The Second World War and the civil war altered its demographic dynamics and the degree of urbanisation through rural migration, a process that was accentuated during the sixties when the Greek "economic miracle" took place (Leontidou, 1997). The tendency to demographic stabilisation in Athens is recent and has been followed by a relative increase in the suburban population and the intensification of the urbanisation of the Attic coastal region, thanks to an original system to provide low cost accommodation (Vaiou et. al., 1995, quoted in Kallis and Coccossis, 2003). Athens shares with London and Buenos Aires the tendency to a decline in the average number of persons per household (from 2.93 in 1981 to 2.78 in 1991) (ESYE, 1981, 1991), the increase of one-person households in the centre of the city reflecting mainly the ageing population, and a tendency to the average rate of natural population growth (from 0.6 percent between 1981 and 1987 to 0.3 percent in the 1990s) (Germanopoulos, 1990; Leontidou, 1997).

However, a big number of unregistered economic immigrants live in Athens. In the prefecture of Attica, according to data from the Organisation for Employment, 194,000 foreigners had submitted (until 1998) their papers for a resident's permission. This figure is estimated to be 50 to 70 percent of the real number of foreigners in the city. A large number of the newcomers reside in neighbourhood clusters in the centre of Athens, in houses rented by locals who moved to the periphery. Another substantial part finds residence in the outskirts of the city and is mainly occupied in construction or agricultural activities (Leontidou, 1997). In the case of Buenos Aires, illegal immigration and the flow of temporary foreign workers were important in the 1990s, when they found employment opportunities in the construction industry and in domestic services and settled in the poorest areas of the Federal capital and peripheral quarters, but their numbers had been greatly reduced alter the devaluation of the local currency in 2001. Many of these workers took advantage of the fixed exchange rate between the Argentinean peso and the US dollar (1 peso = 1 US dollar) that allowed them to send

[17] Although none of the cited provisions establish exceptions that could exclude certain people or groups from receiving the service. On the contrary, Article 13.10.2 of the Concession Contract provides the application of fines to the Concessionaire in the case of "any form of discriminatory or incorrect conduct towards a user or group of users in particular" (Almasi et. al., 2003: 31).

most of their earnings in the form of remittances to their families back in the neighbouring countries where they came from, but after the devaluation many of these workers returned to their countries.

Finally, to complete this reference to the metropolises in the case studies, Dar es Salaam grew at an annual rate of 7.7 percent between 1948 and 1988, and in the last decade the pace of annual growth increased to 9 percent. This has resulted in the overall worsening of an already difficult situation regarding the provision of basic infrastructure and services, with the proliferation of unplanned and un-serviced areas particularly along the transport and service corridors connecting the city. A clear indicator of this process is the large increase in the proportion of the city's population living in squatter areas, which jumped from 44 percent in 1974 to 70 percent in 2002, with 65 percent of the new housing stock being built in these poorly served areas in recent years.

Summing up, in the cases of Buenos Aires, London and Athens, the demographic expansion has been largely due to important migration flows related to the fact that they are national capitals concentrating the administrative, commercial, and –in some cases– industrial centres, and that they enjoy high standards of living and wider choices in terms of employment, education and entertainment. The composition of these immigration flows in recent times is diverse, including rural population (Buenos Aires), foreign immigrants (Buenos Aires, London, and Athens), which in the British case include important flows from the former colonies, and national population returning to the country (Athens). In all three metropolises, on average, the population has been stabilised as a result of the balance between the natural growth rate and the net migration rate, thereby completing the process of demographic transition though simultaneously developing an important process of suburban growth and expansion. In contrast, Dar es Salaam continues to experience a sustained demographic expansion, and the projections suggest that although the pace of growth will slow down the trend will persist underscored by the large proportion of young population living in the city and the attractiveness for rural migrants owing to the better living conditions offered by the city in relation to the rest of the country.

However, within these metropolises there are stark demographic differences and economic inequalities. For instance, the higher natural growth and birth rates are recorded in the poorest areas (Buenos Aires) where the migrants are concentrated (London and Athens). These social groups also share limited access to material and symbolic goods, as compared to the average living standards in these cities (Kertzer and Barbagli, 2003). In the case of Dar es Salaam, the patterns of polarization and inequality are exacerbated given the extreme conditions characterizing the city with regard to the access to material and symbolic goods and services, which is significantly more limited than in the other cases considered here.

In the case of the medium-sized cities we have also observed highly heterogeneous demographic paths, mainly resulting from their different socio-economic dynamics. Cochabamba, Tucumán, and Resistencia have undergone far-reaching transformations and disruption of their local economies as a result of the neoliberal programmes implemented since the late 1980s. Market liberalization, deregulation, and structural adjustment of public spending have been translated into reduced opportunities for social mobility and significant migration flows, which combined with a decrease in

the fertility rates have led to the stabilisation of the natural growth rate of their populations.

Cochabamba has experienced an urbanisation process similar to the rest of Bolivia, characterized by a large rural population, with an annual growth rate of 4.3 percent between 1976 and 1992. The global fertility rate has decreased from 3.8 children per woman[18] in 1992 to 3.1 in 2001, although it is still high in the poorest districts.[19] Nevertheless, Cochabamba's demographic growth is mainly explained through the migration flows that arrived in the city as a result of the disruption of the country's mining industry since the 1980s. The city has received an average of 16,000 immigrants per year between 1996 and 2001, a year when the immigrant population composed over 50 percent of the total population.

In the case of Tucumán, where extended families compose 89 percent of the total number of households, the population increased at an annual rate of 1.3 percent during the 1990s, but there has been also a decrease in the global fertility rate.[20] The city underwent a rapid process of urbanisation owing to the migration of the rural population, as a result of the employment crisis propelled by the changes in the sugar industry, which has become increasingly concentrated and capital intensive. Resistencia, in turn, experienced similar demographic transformations as a result of the decline of the cotton industry since the 1950s, which fuelled migration inflows from the rural areas.

The cities of Limeira and Aguascalientes, in contrast, although sharing some of the characteristic elements of demographic restructuring already described, have experienced significantly different processes. Both centres have seen an expansion of their labour markets and a raise in the living standards of the population, becoming net receptors of migrants looking for jobs and access to better goods and services. In this connection, Aguascalientes has recorded a persistent increase in the annual population growth rate since 1980, higher than the national average, as a result of a constant high level of fertility,[21] strong migratory movements that accounted for 7.3 per cent of the total population in 2000, and a sustained decline in the general and child mortality rates thanks to the improvement of the material living conditions and the urban infrastructure. Nevertheless, Aguascalientes continues to share some important traits with the previous group, such as the fact that the household structure is composed mostly by multi-family units (94.7 percent against 5.3 percent of one-person households). Limeira, in turn, has experienced an average population growth rate of 2.95 percent between 1980 and 1991, and 2.09 percent between 1991 and 2000, slightly higher than the average for the state of

[18] The global rate of fecundity is a theoretical indicator of the level of fecundity and shows the number of children by woman (assuming that the woman has not died before the end of her fertility period).

[19] The changes in the rate at the national level was from 6.5 children per woman in 1975 to 4.4 in 2001 (INE, 2001, 2003).

[20] The global fertility rate registered a downward tendency from 2.99 in 1990 to 2.77 in 1995 and 2.59 in 2000 and the estimations for 2005 suggest a rate of 2.44. Still, Tucumán has one of the highest rates in the country (INDEC, 1996).

[21] The population increased from 359,454 inhabitants in 1980 to 643,419 en 2000. The general mortality rate fell from 6.3 per thousand in 1980 to 4.1 in 2000, while the infant mortality rate dropped from 25.5 per thousand in 1990 to 15.7 in 2000. Life expectancy has risen from 71 years in 1980 to 76.4 years in 2000.

Sao Paulo (1.8 percent).[22] This demographic expansion was fuelled by a significant migratory process underscored by the attractor of higher living standards in the city, which has a very high level in the country's Human Development Index (HDI).

Niterói has followed a different pattern closer to the characteristics of a mature city rather than those found in urban conglomerates undergoing metropolization processes. In 2002 the city recorded the highest mark in the HDI of the state of Rio de Janeiro,[23] and during the 1990s its annual rate of population growth was 0.56 percent, the lowest in the state, while the net migration rate was negative in the same period (0.31 percent). In turn, the Lakes Region increased its population at an annual rate of 4.1 percent between 1999 and 2001, although the rate was especially high in the municipalities that house the very successful summer tourist resorts (Buzios and Cabo Frio) and in the locality of Iguaba Grande (CIDE, 2003).

From an overall perspective, all the intermediate cities considered –with the sole exception of Niterói which was just described– have followed a pattern of demographic expansion mainly produced by migration processes. In some cases, migration flows have been the result of economic expansion and improving living standards (Limeira, Aguascalientes, and the Lakes Region), in others they have been caused by the disruption of rural life and the crisis of the agro-industrial sector (Tucumán and Chaco), and still in other by the collapse of the mining industry (Cochabamba). Also, with the exception of Aguascalientes, all these cities have seen the stabilisation of the natural growth population rate. Finally, the Finnish localities (particularly Kangasala) record a strong annual population growth rate of 1.9 percent (Äikäs, Juuti, and Katko, 2003), while Nyeri in Kenya also experienced rapid demographic expansion between 1989 and 2001 growing by one third during this period.[24]

Thus, the initial classification of the cities according to population size is broken down and reorganized through the examination of their different characteristics according to sex, age structure, and demographic dynamics. This is an important consideration for assessing the challenges facing the provision of WSS in these cities, in particular related to the MDGs in developing countries, which do not only depend on overall population and urban size or aggregate demand for the services. In this regard, looking at the diversity of the age structures and the dissimilar trends in the natural population growth in the different cities allows a more refined approach to leads to the observation and analysis of the economic and migratory trends and the socio-spatial distribution of the population. This exploration suggests that, although the analysis of these trends and characteristics requires the consideration of the cities as a whole, there is a need to refocus the analysis for unearthing the diversity of concrete social territories that coexist within these large urban conglomerations. Incorporating the multiplicity and heterogeneity of intra-urban social conditions into the equation is a fundamental requirement for any strategy to expand and enhance WSS through PSP or other means, as these conditions impinge directly of the chances of success or failure of such policies.

[22] Based on demographic indexes elaborated by the SEADE Foundation, and calculated upon primary data collected by the national census (IBGE, 2000).

[23] In the same year Niterói ranked fourth in the country's HDI (IBGE, 2000).

[24] From 91 thousand to 120 thousand people.

Spatial distribution of the population and inequality patterns

The configuration of human settlements and their patterns of development and geographical distribution are major factors affecting the management of water resources and WSS. They underpin some of the most important challenges facing the policies aimed at achieving universal access to drinking water and sanitation services as expressed in Millennium Development Goals, and constitute significant factors determining the chances of success and failure of PSP in the sector (UNDP-World Bank, 1999). For instance, varying patterns of urban concentration are expressed in differential needs in relation to the extension, repair and maintenance of the WSS networks, as reflected for instance in the observed association between high population density and ageing networks. At the same time, the association between population density and water demand (Ghisham and Fleming, 1989: 35-42), which sometimes may be boosted by higher needs derived from the maintenance of public spaces (Douglas, 1983), tends to be increasingly mediated by technological advances (such as water recycling and rainwater harvesting for non drinking water uses).

The heterogeneous relationships that can be observed between demographic density and impact on water resources and WSS is not limited to variations between cities with different population size but is also an intra-urban phenomenon. In this regard, the provisional categorization of cities according to population size needs to be further refined by exploring the inequalities in the material living conditions within cities and the ethnic, age, gender, and class cleavages underpinning the spatial distribution of social groups in the urban space. Let us consider first the distribution of the case studies according to their population density (Table Nº 4).

Table Nº 4. Population density

CASE STUDIES	DENSITY (INHABITANTS/km^2)	URBAN AREA (km^2)
Buenos Aires, Argentina (2001)	13,679.6	202,90
Athens, Greece (2001)	6,979.0	456.74
San Miguel de Tucumán, Argentina (2001)	5,862.3	90.00
London, England (1997)	4,480.0	1,590.00
Cochabamba, Bolivia (2001)	3,713.0	55.63
Niterói, Brazil (2000)	3,507.0	134.50
Resistencia, Chaco, Argentina (2001)	3,489.0	104.8
Buenos Aires Conurbation, Argentina (2001)	2,394.4	3,627.00
Dar es Salaam, Tanzania (2002)	1850.0	1350.0
Lahti, Finland (2003)	726.0	***
Nyeri, Kenya (2001)	721.0	20.80
Tala, Kenya (1999)	721.0	33.70
Limeira, Brazil (2000)	430.0	579.00
Municipalities in the Lakes Region, Brazil (2000)	136.4	2957,9
Aguascalientes, Mexico (2000)	68.9	86.26
Kangasala, Finland (2003)	65.0	***
Nurmo, Finland (2003)	31.3	36.20
Lapua, Finland (2003)	18.6	75.00
Kauhava, Finland (2003)	16.8	48.50
Kuortane, Finland (2003)	9.5	46.20

Source: National censuses (see References)

The first observation that can be made from Table 5 is the lack of correspondence between large population size and high density. The group of cities with the highest population density is not limited to the large metropolises but also includes medium-sized cities like San Miguel de Tucumán, Niterói, Cochabamba, and Resistencia, all of which experienced sustained growth during the second half of the 20th century in the context of intense urbanization processes. The lack of correspondence between large population size and high density is also clear in small localities like Lahti in Finland, whose density is higher than that of more populated cities like Aguascalientes in Mexico or Limeira in Brazil. Moreover, the differences are not limited to the inter-urban comparison but also extend to the intra-urban space. In this regard, what differences can be found within these cities in relation to population density? What are the problems and challenges that these differential patterns of urban development and structure present to the provision of safe

and universal WSS, and for the introduction of PSP in the sector? Let us examine the cases in more detail.

The metropolises

In Buenos Aires, population density varies according to the area. By 2001, the capital city was the most densely populated urban space in the country with 13,843.9 people per square km, although this figure represented a significant decrease of around 1000 people per square km since 1991, when the rate reached 14,827 people per square km. In contrast, the conurbated metropolitan area experienced an increase of 200 people per square km between 1991 and 2000, a process fuelled by the continued migration flows from the interior of the country and reinforced during the 1990s by the suburbanization of wealthier middle-class sectors to residential or private neighbourhoods in the conurbation. Simultaneously, the population living in the poor neighbourhoods of the periphery doubled in the same ten year period, which can be been partly explained by a high birth rate in the poorest areas. From an overall perspective, between 1991 and 2000 the relative variation of the population density in the whole metropolis was 9.2 percent, while peripheral districts like Ezeiza or Florencio Varela –that have a high concentration of population under 14 years old– experienced increases of 57.8 percent and 36.9 percent respectively (INDEC, 2002). These demographic changes have an impact on both water resources and WSS, in particular because the demographic concentration is taking place mainly on river margins and in poorly served areas that lack basic infrastructure. In addition to the expanding needs for safe water supplies, the lack of adequate sanitation has prompted a rapid increase in the volume of wastewater being released untreated into the environment. This has been compounded with the proliferation of uncontrolled dumping of domestic and industrial waste into land sites and water courses (CEAMSE, 2002), worsening the already polluted aquatic environment of the metropolitan region.[25]

In contrast with the Buenos Aires case, in London the previously chaotic pattern of urban development was replaced after the Second World War by strategic planning led by the State and the local authorities.[26] Eight satellite cities were designed and built forming a ring at distances of between 20 and 30 miles around London, and a green belt to contain urban development was consolidated. As a result, although London[27] is one of the world's largest urban centres with regard to its built-up surface, about 42 percent of its total land area is in non-urban use, including semi-natural or mown grass, tilled land, deciduous woodland, and water. Nevertheless, the metropolization of London has turned England's whole South-eastern area into a single regional entity that encompasses the fastest growing population in the country. In the metropolis, the development followed a

[25] According to the International Institute for Environmental Development (IIED), in the Greater Buenos Aires, where 50% of the country's manufacturing industries are located, less than 10% of the industrial units have wastewater treatment plants (IIED, 1999).

[26] The 1947 Town and Country Planning Act (Castro, 2003a: 9)

[27] The sources of the following information on London are mainly: Focus on London 2003; and Matheson and Holding (1999).

concentric pattern with a sparsely populated core, a higher density ring surrounding it, and an outer ring with decreasing densities towards the edge of the urban area, which is a classic pattern in mature cities. While the old metropolitan core, the City of London, has the fourth lowest density among the city's boroughs with 2,400 persons per square km, the boroughs of Kensington and Chelsea and Islington record the highest densities with 13,300 and 11,700 persons per square km respectively (data for 2001).

Inner London currently houses 39 percent of the metropolitan population (2001). Outer London experienced its expansion later, between the 1920s and 1930s, with a peak in 1951 with 4.52 million people. Outer London's population had a slower decline in 1988 with 4.22 million, but it also has been recovering to its present 4.4 million. The recent changes suggest the continuity of the outward pattern of population dispersal towards the outer ring, with some pockets of growth in Inner London. A comparatively high birth rate of nearly 15 per thousand residents and an average death rate of less than 9 per thousand residents have underpinned the renewed population growth. The inner boroughs of London are still an attractor pole for young people in search of employment opportunities, with net migrations inflows concentrating between the ages of 16 and 24. People in their thirties and forties, who seek better living conditions outside London, account for the net outflow recorded in this age sector. There is also an outward movement of people at and over retirement age. Overall, although London's share of the country's population has remained relatively stable at about 12 percent, since the early 1990s, in 2001 the natural population growth (birth less deaths) in the metropolis has accounted for 70 percent of the country's total.

The change in the ethnic composition of its population is perhaps the most important transformation in post-war London. By 1971 6.4 percent of the population in Greater London had been born in the former colonies, and by 1991 over 20 percent of the metropolitan population belonged to ethnic minority groups compared to 5.5 percent at the national level. The trend continued and in 2001 the proportion had grown to 29 percent of the metropolitan population (compared to 8.7 percent at the national level), which accounts for 46 percent of the country's total population with ethnic origin[28]. A large share of these groups lives in the Inner boroughs and composes London's poorest population, one of the spatial expressions of the intra-urban segregation characterizing the British capital. In this regard, there are important clusters of high social and ethnic differentiation and this process has prompted the emergence of an ethnic underclass, which has been caught in a vicious cycle of poverty, deprivation, and semi- or complete unemployment.[29]

Although London is still the wealthiest city in the country, it also houses some of the most unequal and deprived areas in the United Kingdom. According to the 1998 Index of Local Deprivation published by the Department of the Environment, Transport and the Regions (DETR), five of London's boroughs are amongst the ten most deprived districts in the country, and thirteen rank amongst the worst twenty A similar situation has been

[28] According to data for 2001, the main ethnic minority groups are Asian or Asian British (Indians, Pakistanis, Bangladeshis, or other Asians) accounting for 42% of the capital's ethnic population, and Black or Black British (38%) (National Statistics Institute, 2001).

[29] Similar processes have been identified in most metropolises of Europe and the United States (see Wacquant, 2003).

detected at the ward level, where London's has fourteen of the twentieth most deprived wards in the country. As shown, the central and eastern areas of the city are the worst affected and rank high in all dimensions of deprivation, while there are also highly deprived wards in boroughs that have a relatively better overall situation (LRC, 1996; Anderson et. al., 1997). Ten London boroughs were included among the most severely deprived districts in England in 1998. In this regard, the situation of the city's housing stock shows a higher degree of deterioration than in other regions. While about 34 percent of London dwellings were built prior to 1919 compared to a national average of 25 percent, the share of housing built after 1970 in the metropolitan area is less than one half the national average. About 8 percent of the capital's dwelling stock was considered "unfit for human habitation" in 1999. Finally, another indicator of deprivation in London is statutory homelessness, which tends to be much higher in London than in the rest of England (9.5 to 6.1 per 1,000 households respectively in 1995) and is particularly acute in Inner London (13.8 per 1,000 households in 1995). In March 1998, there were 29,600 households accepted as homelessness by the boroughs, more than twice the figure registered in 1986, and by 2002 the figure had jumped to 52,700 households, which represents an 88 percent increase in homelessness since 1997.

The case of Athens is fairly different from the previous two. In terms of socio-economic and political characteristics, Athens stands "in-between" the developed cases of northern Europe (England, Finland) and those of Latin America and Africa. Greece's urbanisation pattern was characterised by a rapid rural-urban migration and a process of overpopulation of the country's capital, which places Athens closer to the Latin American cases than to those of Western Europe. The centralised, clientelistic administrative system of Greece, and the relatively recent democratisation of its political system (1974) for European standards, is also similar to the Latin American experience. However, being a full member of the European Union, Greece's economy and political organisation has in many ways converged with the rest of Europe in the last two decades. Conversely, the high degree of social homogeneity and the low (though increasing) income disparities differentiate Athens from most Latin American and many European cities. Athens scores exceptionally well in almost all social/equity indicators and consists of a spatially homogenised society (Leontidou, 1997).

Spatially, there is no sharp class segregation in Athens as reported in many Western metropolises. Whereas in the pre-war and first post-war decades Athens' neighbourhoods developed as spatially desegregated regional clusters of defined socio-economic characteristics, the situation gradually changed as the city grew. The general income depolarisation (enhanced by the informal economy) and the creation of a middle class, as well as the inheritance of family residences as working-class parents passed their property to middle-class descendants, combined with rigidities in the housing market (due to high transaction taxes), dissolved this pre and post-war class polarisation. Moreover, state policies in the dictatorship period (1968-74) aimed at dispersing working class neighbourhood enclaves. Coupled with the increasing construction of multi-storey apartment blocks, these led gradually to a vertical (i.e. within buildings) instead of a horizontal neighbourhood differentiation (Leontidou, 1997). Homelessness is absent largely due to self-built housing and the important role of the family in the wider distribution of wealth, owner-occupation and unemployment relief. Social cohesion is partly the result of important informal relationships, such as family support and income

sharing to unemployed youngsters, which on the other hand creates a dis-incentive for employment, and partly a side effect of the sizeable informal economy. In Athens, the socio-spatial homogenisation of the city is changing as nuclei of poverty and homelessness are created in the inner and northern parts of the city by illegal, underpaid immigrants in short-term jobs. Given the rising unemployment among the local population, it seems that the long-term stability of the city's remarkable social equality and homogenisation may be at stake.

In Dar es Salaam the particular form adopted by the city's growth, largely concentrated along the coastline and main communication arteries, contributed to a radial pattern of development favouring nodal areas of the city with relatively better infrastructure and services while leaving large sections unserviced and subject to processes of chaotic urban expansion. In a pattern not unfamiliar in poor developing country urbanization processes, many informal settlements have mushroomed in unsafe locations like flood plains, hills prone to landslides in the rainy season, and hazardous waste sites. About 80 percent of the city's population live in these areas characterized by lack or poor provision of basic services like roads and WSS, many of which form part of a complex overlapping of formal and informal settlements with highly different rates of population density. One person households are an important feature of the population structure in the city. Of particular interest is the fact that female-headed households constitute 13.1 percent of the urban and peri-urban population, and this is a particularly vulnerable group both because of its reliance mainly on informal economic activities and because women spend a disproportionately high amount of time in the tasks associated with the collection, transportation, and storage of water, which significantly reduces their chances of engaging in more rewarding economic activities (WaterAid, 2002).

In an overall perspective, despite the striking differences separating these large metropolises, it is worth highlighting some common traits like the dispersal of middle-aged population towards residential suburban areas, the segregated concentration of poor migrants above the national average in the cases of Athens and London –especially in the inner city neighbourhoods (Borja and Castells, 1997: 4-6)–, and processes of polarization of the urban space with degradation of a substantial share of the housing stock (London) and the widespread deterioration of the WSS infrastructure (Buenos Aires, London).[30]

The intermediate and small cities

In the medium-sized cities, the urban development processes at work differ from the cases examined above in important respects. An important common trend is the metropolization fuelled by population growth, especially through migration inflows, which leads to a process of urban integration. In this regard, this metropolization process is twofold: on the one hand, it comprises the increasing integration of rural and peri-urban population coming from rural areas, which increases the demand for urban services and employment. On the other hand, the urban space is reconfigured with the expanding population, disorganized urban growth, and the segregation of poor rural migrants who

[30] About the recent process of social and cultural dualization in Latin American cities see Touraine (1998). For a demographic and historical perspective see Lattes (1983).

settle in unserviced areas, often unfit for human occupation, a process that has been conceptualized as the "urbanization of poverty" (Ledo, 2002). These spaces are weakly integrated in the processes of urban planning and management, and have a pattern of poor or null provision of basic utilities and a degraded environment. In general, the expanding population in these poor areas has no access to safe WSS, but their low capacity to pay for commercialized WSS renders these settlements unattractive for private sector operators. Let us examine some examples.

The province of Tucumán, with 22.524 square km, is the smallest and most densely populated in Argentina. The population is concentrated along a belt extending to the south and running close to the sugar mills and other industrial and commercial areas. The rapid urbanization process can be illustrated by the growth of the urban population that represented 54.3 percent of the total in 1960 and by 1991 had grown to 77 percent (INDEC, 1993: 28-9). The capital city that housed 30 percent of the provincial population in 1947 had concentrated 52 percent of the total by 2001 (INDEC, 1993). The new settlements formed by the migrant poor are mainly composed by households with a high number of children and have no access to safe WSS. A large population has settled in the floodplain of the Salí river while others have built their precarious housing near other hazardous sites such as open air waste dumps where untreated waste from the sugar mills and the fruit industries is poured.[31]

Tucuman's urban growth can be analysed into a first expansive stage trebling the urban area (from 29.82 square km in 1950 to 94.47 square km in 1980), and a second densification stage when the urban expansion was limited to a growth of 22.92 square km in 18 years, reaching its present surface of 107.45 square km (Cuozzo et. al., 2002: 6). Located on the Salí river basin –which in turn accounts for 80 percent of the province's water resources (IPDU, 1994)–, Tucuman's metropolization involved the incorporation of several neighbouring municipalities, including the Banda del Río Salí with 110,000 inhabitants and a high population density (1,645 inhabitants per square km) (Gómez López, 2000; INDEC, 1998: 38).

A similar trend can be observed in Resistencia, where urban expansion was left largely unregulated. Poor informal settlements invaded depressed marginal areas and reclaimed part of several water bodies, which afterwards became trapped in the urban mesh (the Arazá River and parts of the Negro River margin). As a result, the urban growth encroached into the lakes, distorting the pre-existing spatial and ecological systems, and creating the conditions for recurrent flooding events that take place during the rainy season and affect particularly the peri-urban areas. These problems are compounded by the serious infrastructure problems affecting the disposal of wastewater (Roze, 2000).

Like in Tucumán, the metropolization process of Aguascalientes consisted in the expansion of the urban space into the periphery, integrating formerly isolated urban centres. Sustained economic growth and improvement of living standards since the 1970s have propelled migration inflows from neighbouring localities and even from the Federal District, the country's capital. During the nineties, the relative growth of the city's area was higher than population growth, thereby reducing the density from 82.7 inhabitants per square km in 1990 to 68.9 in 2000. Estimates by the State Population Council have

[31] Mansilla and Soria (2000); Bomba (1994). Pollution analyses of the Salí river water in the metropolitan area have showed levels of BOD ranging from 20 mg/lt to 712 mg/lt. (Cuozzo, et al., 1999).

predicted that the metropolitan area will have over 1 million people by 2025, which means an expected growth rate of 1.54 percent per year. The metropolization process has also influenced the demographic growth of peripheral cities like Jesús María, San Francisco de los Romo, Gómez Portugal and Pocitos.

Cochabamba grew 2.24 times between 1976 and 1992 and has an extension of around 95 square km. The process of urban expansion resulted in a combination of concentrated and dispersed urban units that have developed in a highly disordered fashion. The highest concentrations are found in the Old City and around the central market place, where there are 16,287 inhabitants per square kilometre, and other places like Cerro Verde and San Miguel where the conditions are much worse with rates of 19,706 inhabitants per square kilometre. The intra-urban differentiation of demographic processes can also be illustrated by the differential growth rates observed in the different parts of the city: while in the old city and other traditional quarters the annual growth rate was negative in the 1990s, other areas like Huayra K'hasa, Hipódromo, Barrio Minero, and Alalay, experienced growth rates in excess of 9 percent. Downtown Cochabamba houses about a quarter of the city's population, and has a density rate twice as high as the city's average. As a general rule, the inhabitants of the poorest areas live in highly overcrowded dwellings, with an insufficient provision of basic services both in terms of quantity and quality (WSS, waste collection, flood prevention), and face problems common to most poor settlements such as insecurity of the land titles or outright illegal occupation of the land.

The lack of access to WSS and the pollution of the water courses running though the poor settlements is also a serious problem in the cities of Niterói and Limeira. In Niterói, the poor population living in "slums", 23.4 percent were not connected to the water system, while approximately one third (34.2 percent) had no access to the sewer system. Their dwelling lie where the whole volume of effluents collected is discharged into channelled watercourses running across the city. This water, in turn, runs towards the beaches surrounding Guanabara Bay without going through any adequate treatment, as Icarai's Sewage. This situation remained almost unchanged along the 90's, except for some improvements performed in the sewer system infrastructure of the urbanised slums located inside the Guanabara Bay's basin.

In Limeira, the inflow of migrants mentioned before resulted in the illegal occupation of public areas by poor persons with great difficulties to pay for the services of drinking water and sanitation. These lands run close to the Tatu River, an affluent of Piracicaba River, whose basin suffers from serious pollution and water shortage problems, Limeira city alone is responsible for 40 percent of the pollution discharged into Piracicaba River, including domestic and industrial effluents. Urban growth was characterised by the lack of planning and controls or guidelines from the government (see Vargas, 2003: 37). In order to avoid a potential conurbation with the municipality of Americana, in 1999 the town hall passed a law restricting the parcelling of urban soil, thereby restricting expansion and directing its growth in the opposite sense. The law included the application of "development corridors" to cover the new real estate enterprises. In the same year, another law was passed for the protection of the water sources and designed to limit the degradation of water resources. In the case of the Lake Region, the population increases substantially during the summer period owing to the inflows of tourists to the beach resorts in these municipalities, reaching up to 700

thousand people per year. These temporary residents also demand essential services, in particular WSS, but the fact that this demand is restricted to a few months in the year makes it unattractive for the water utility to invest in infrastructure expansion given the potential problems to recover the investments.

In the case of Finland, a series of legal and regulatory instruments protect the environment and the quality of WSS by clearly demarcating the responsibilities of the different actors involved, in particular the state and the private manufacturing industries, which are the major polluters of water sources in Finland. In the Kenyan case, conversely, there is a difficult situation characterized by worsening pollution of water resources, largely because of the lack of wastewater treatment facilities, inadequate regulation, and the uncontrolled proliferation of urban settlements.

Summing up, this section has explored the multiple characteristics that underscore the conditions of urban heterogeneity in the cities studied. This complex diversity is explained by a number of intervening variables that determine the urban configurations, which in turn are articulated with often dissimilar values, uses, and customs, associated with the access to WSS that are a crucial component in any strategy directed at expanding and enhancing the provision of WSS. These characteristics, from another angle, are also interwoven with fundamental socio-economic processes that also play a central role in the analysis, and to these we turn in the next section.

Socio-economic dimension[32]

This section addresses the main socio-economic trends characterizing the cities covered in the study in a comparative perspective looking at their key similarities and differences. In this regard, we analyze a series of socio-economic indicators, their evolution and changes, and explore how they may be related to the processes involved in management of WSS. The analysis pays particular attention to the socio-economic characteristics of the population, the internal patterns of structural differentiation, and the concrete expressions of these aspects in the social structuration of the urban space, which are significant elements in the management of WSS.

[32] By Gustavo Forte.

Chart Nº 1. Weight of city GDP within the country's GNI (% - selection of cases)

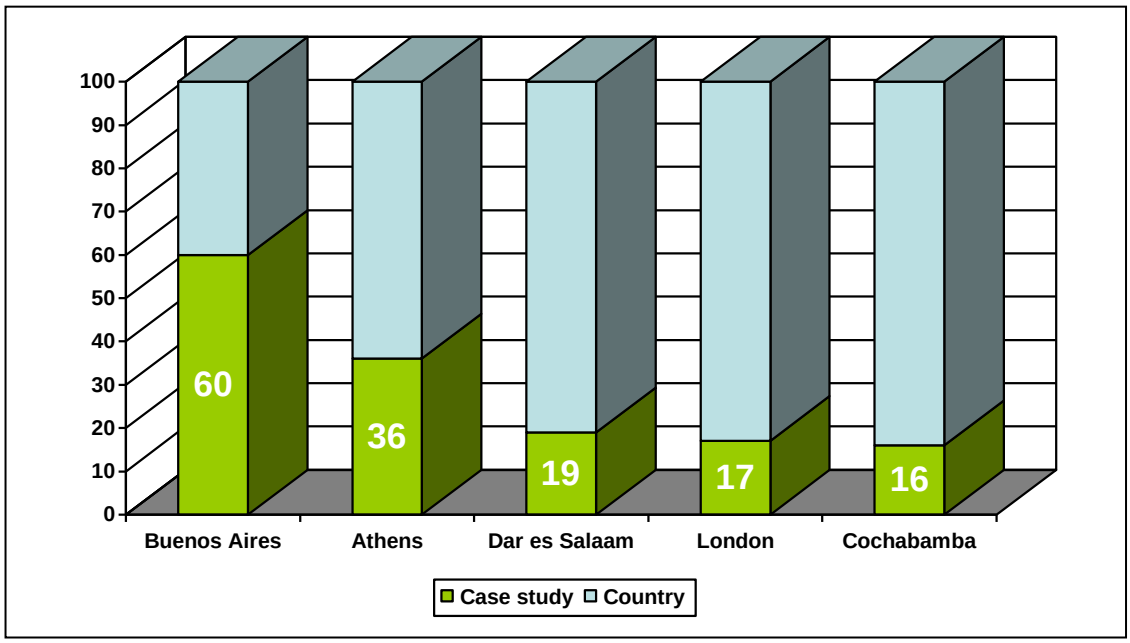
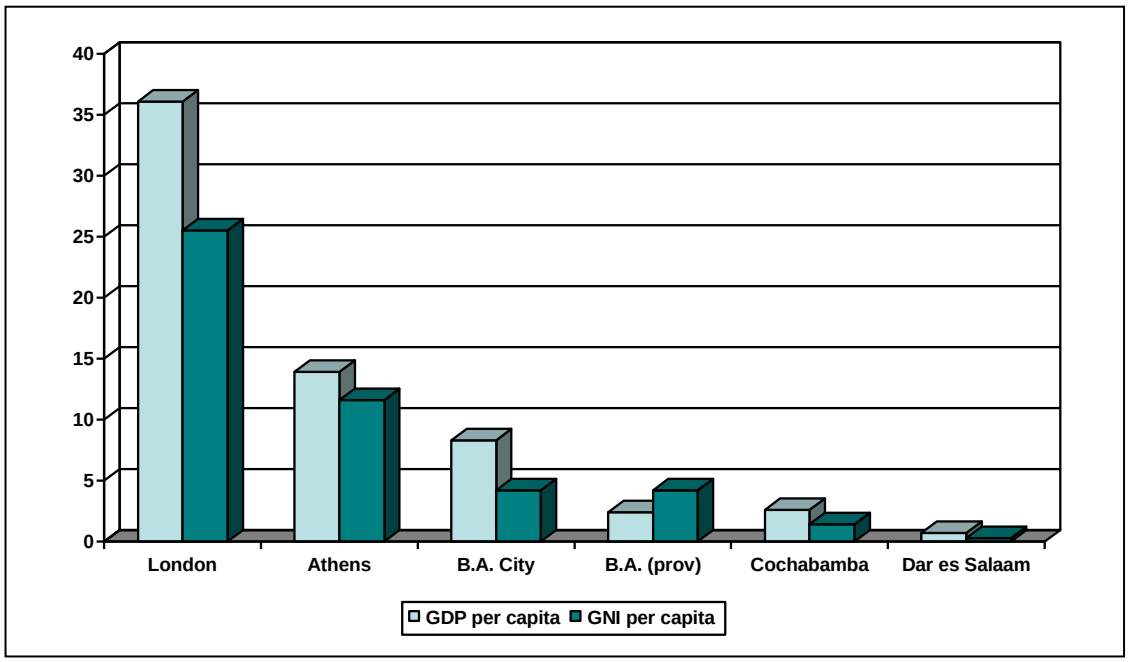


Chart Nº 1 provides a graphic description of the relative weight of the cities in their country's context, measured by the relationship between the cities' Gross Domestic Product (GDP) with the Gross National Income (GNI). London and Athens represent 17 percent and 36 percent of the GNI respectively. In Argentina, in 1999 the Province of Buenos Aires and the Federal Capital (City of Buenos Aires) represented 36.10 per cent and 24.80 per cent of the GDP respectively, and together represent slightly over 60 percent of the GNI. The Province ranks first among the 24 Argentinean districts for its weight in the GNI, and the City of Buenos Aires holds the second place. The Buenos Aires Metropolitan Area (BAMA) is the social territory with the greatest demographic, economic, and political-institutional concentration in the country, followed in importance by the rest of the Buenos Aires Province, and the Provinces of Cordoba and Santa Fe (Morano and Lorenzetti, 1994; Rofman and Marques, l988). It is worth highlighting that the main PSP programmes in the WSS sector in Argentina have precisely targeted these urban concentrations. In this regard, the French company Suez (Ondeo) heads the consortium Aguas Argentinas (AASA) in charge of the concession of WSS in the BAMA, and is also the leading partner in the private consortiums operating WSS in Cordoba and Santa Fe.

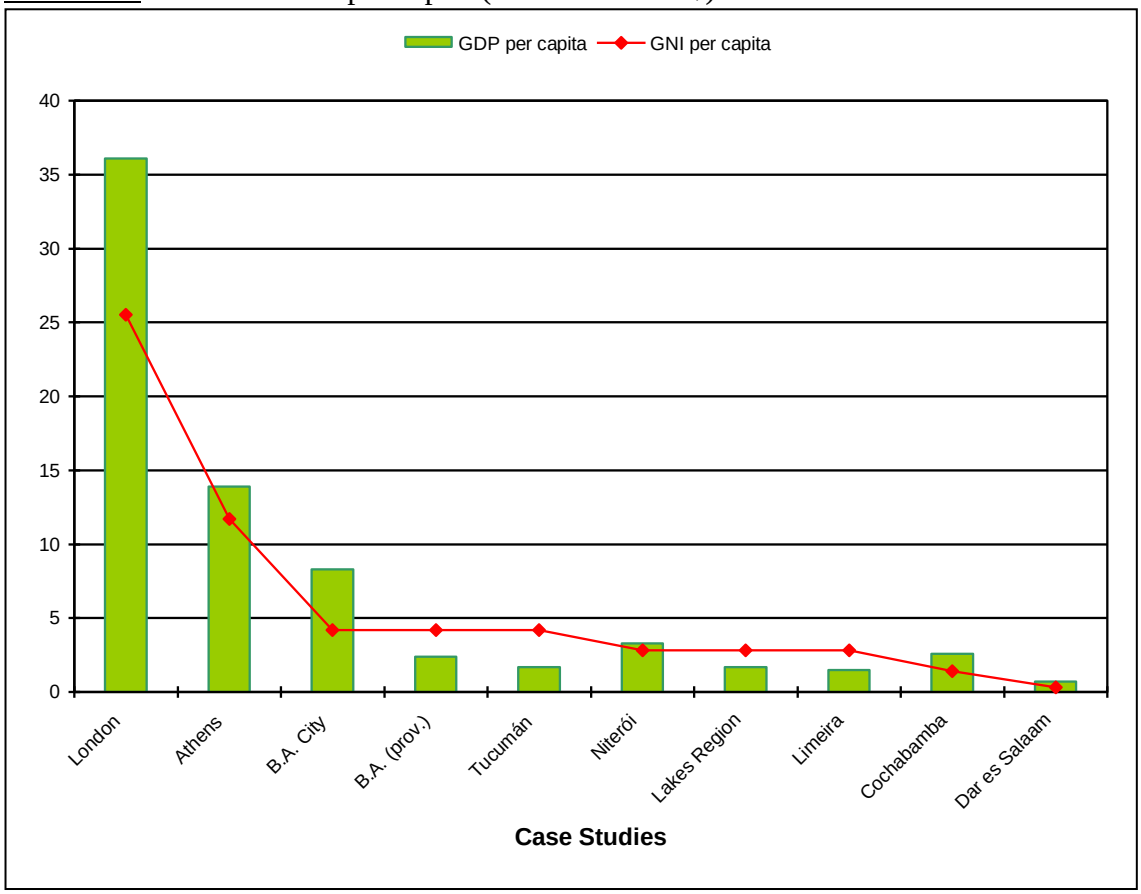
Cochabamba in Bolivia and Dar es Salaam in Tanzania, represent 16 percent and 19 percent of the GNI respectively. Moreover, their GDP per capita is remarkably higher than the GNI per capita of their respective countries. London and Athens are respectively 40 percent and 20 percent over their national average. The per capita consumption in Cochabamba municipality (US$ 2.565 per year) is the highest of Bolivia, almost doubling the national average, and the GDP per capita in Dar es Salaam more than doubles the national average. In the case of the Buenos Aires Metropolitan Area, while the City of Buenos doubles the national average, the suburban area represents almost half of it.

Chart Nº 2. GDP and GNI per capita (in thousand US$) in a selection of cases



The second group of cities, composed by Tucumán, Aguascalientes, Niterói, Limeira, the Lakes Region, Nyeri and Tala Town (Kenya), and the six Finnish municipalities, are in stark contrast with the previous group. Not only they have lower demographic and political importance, but also their GDP has a lower weight within the GNI. For instance, Tucumán represents 2.6 percent of the GNI, raking sixth among the 24 Argentinean provinces. In the municipalities of Niterói, Limeira and the Lakes Region in Rio de Janeiro, the GDP represent 0.4 percent, 0,1 percent and 0,09 percent of Brazil's GNI respectively. Thus, in most cases of this second group of cities, with the exception of Niterói, the GDP per capita is below the national average. Tucuman's GDP per capita ranks twentieth among the 24 provinces in Argentina, while Limeira and the Lakes Region recorded half of the country's average GDP. In contrast, Niterói's GDP per capita ranks second in Rio de Janeiro State, and is above the rest, including the GDP of Buenos Aires Province in Argentina.

Chart Nº 3. GDP and GNI per capita (in thousand US$) in a selection of cases



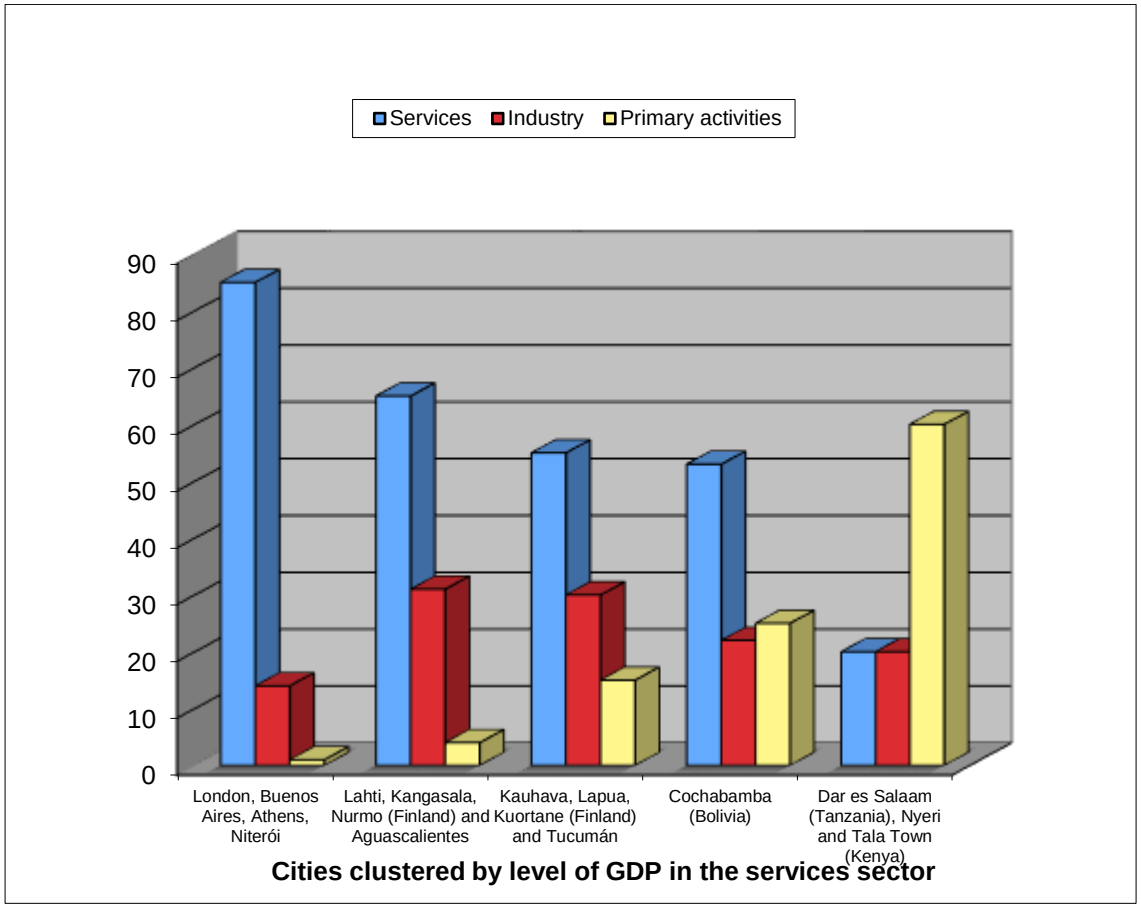
This diversity of values and distribution of the GDP per capita is the outcome of the particular configurations of productive activities characterizing the cities, which in turn are an expression of the diverging degrees of integration and differential levels of technological development, production, and capital accumulation in these urban centres.

GDP structure by sectors and main economic activities

As shown in Chart Nº 4, the GDP structure by sector of activity in the majority of the cities under study, with exception of the African cases, reflects the global trend of the world economy towards terciarization, fuelled by the increasing importance of the value produced in the services sector. These are, in particular, activities related to the production and management of information and communication, which have introduced radical changes in the identity and conditions of the labour force. Correspondingly, the weight of the value generated by secondary (mainly industry and construction) and,

especially, primary activities is much less significant, with the exception of Cochabamba where the primary and secondary sectors have almost the same weight.

Chart Nº 4. Comparison of GDP Structure by Sector[33]



The first group of cities, with 80 percent of their GDP produced in the services sector, includes London, Buenos Aires, Athens and Niterói. These centres are typical examples of the global economic trends towards an expansion of tertiary activities, the simultaneous reduction of the relative weight of the industrial sector, and a negligible presence of primary activities in the generation of value. It is remarkable the increasing importance of financial, real state property, managerial, and rent services in this group of cities, although there are some important differences between them. For instance, in 1998 these sectors accounted for 42 percent of London's GDP and employed 33 percent of the city's labour force. In Buenos Aires this group of activities has also been responsible for

[33] The chart groups the cities according to the structure of produced value in the main economic activities. The order in the distribution of the different groups is given by the empirical trend towards the dominance of the services sector.

an impressive 36.8 percent of GDP in 2002, but their impact on employment has been significantly less important, accounting for only 17.5 percent of the employed labour force. In Athens, the respective figures in 1998 were 24 percent for the share of GDP produced by this group of activities and 11.7 percent for their share of the labour market. However, these trends are not an exclusive characteristic of this group of cities, as Cochabamba –included in another group– during the 1990s experienced a qualitative transformation and the GDP produced in the city's services sector increased from 7.7 percent in 1998 to 14 percent in 2000.

In the cases of Aguascalientes, Tucumán, and the six Finnish municipalities the increasing trend towards terciarization can also be observed. However, in this group of cities the secondary sector is still an important component in the generation of value, particularly in the manufacturing industries. In fact, in Aguascalientes and Tucumán there has been a trend towards the strengthening of secondary activities in the last few decades. In the first case, the city accounts for over 80 percent of the industrial production of the state of Aguascalientes, where the share of GDP produced by the secondary sector increased from 29.3 percent in 1993 to 35.7 percent of the state's total in 2002. Tucumán had experienced a similar trend earlier on, when the industrial share of provincial GDP grew from 22.5 percent in 1970 to 31 percent in 1993 and 30 percent in 2001, but in the last decade or so it has lost over 50 percent of its industrial sector. Moreover, unlike Aguascalientes where the GDP component derived from primary activities has remained relatively stable in the last decade, Tucumán has seen a significant reduction of the value originated in the primary sector, which declined from 22 percent of provincial GDP in 1970 to 11 percent in 1993 and 11.5 percent in 2001. This growth was accompanied by a slight decrease both in the primary and in the tertiary sectors. The municipality concentrates 80.2 percent of the state's industries and just the industrial sector generates 32 percent of the state's GDP.

Some of Finnish municipalities (Lahti, Kangasala, and Nurmo) have a similar productive structure to that of Aguascalientes, with a fast developing process of terciarization but also keeping an important secondary sector mainly comprising manufacturing industries such as furniture (Lahti) and food processing (Nurmo), and relatively small primary sector. In contrast, the other three municipalities (Lapua, Kuortane, and Kauhava) have a GDP structure closer to the case of Tucumán, where despite its long-term decline the primary sector is still important, with percentages slightly over 11 percent in Lapua and Kauhava and 17.7 percent in Kuortane, and less developed industrial and services sectors.

Cochabamba is to a certain extent an outlier given that the process of terciarization is taken place while primary activities still retain a significant weight in the production of value, higher than industry. To a large extent this particular pattern can be explained as the result of the oil boom that has taken place in the area since the 1990s, that has placed Cochabamba as the second oil producer and fourth gas producer in the country. Although this has changed the traditional character of the Cochabamba valley as a region of agriculture, this activity still represents 15 percent of the regional GDP (Crespo et. al., 2003).

Finally, the remaining African cities stand in sharp contrast to the other groups, with a significantly smaller weight of tertiary activities on the GDP, equivalent to that of industrial production, and a large primary sector accounting in average for over 50

percent of total GDP. In the cases of Nyeri and Tala (Kenya) the main productive activities are linked to a rural subsistence economy, while in Dar es Salaam the primary sector, particularly agriculture, is the most important component in the GDP structure. This reflects the structure of the country, as 85 percent of total employment is in the primary sector, although the weight of agriculture in the GDP has decreased during the 1990s from 48 percent in 1992 to 44.8 percent in 2002. In turn, there has been an increase in importance of the services sector, which passed from 35.8 per cent to 39.3 percent during the same period, and a simultaneous decline in the activities related to urban industry. Tanzania's GNI per capita increased from US$ 210 in 1998 to US$ 280 in 2002 (World Bank, 2003).

Summing up

London, Athens, Buenos Aires, Tucumán, and Dar es Salaam, although in different degrees, have experimented de-industrialisation or re-localisation and modernisation processes of the industrial sector. Tucumán for instance has lost in the last 20 years half of its industrial premises, however the industrial GDP increased percentage points in the same period. In Athens, between 1981 and 1991, employment in the secondary sector fell from 38.2 percent to 27.8 percent. In Dar es Salaam, although in the context of a very different economic structure, there is also a clear decline in the urban industrial sector. The intensity acquired by these processes both in London as in Buenos Aires, constitutes one of the factors to which problems in the rise of groundwater levels –among others- are attributed, affecting significantly the urban infrastructure in various areas. (And warn about the consequences that these processes can release in other countries). In London, the eradication of industrial activities from the metropolitan area since the 1960s has led to lower abstractions and therefore groundwater levels have been rising at rates of between 1 meter per year to 2.5 meters in places like Trafalgar Square. One of the effects of raising water levels is the threat of large-scale damage to buildings and other urban infrastructure, in particular underground tunnels like the London Underground system.

Indicators of social and institutional instability

Although the localities studied are strikingly different in many respects, in all cases it was possible to observe clear trends of increasing social inequality, which are expressed in the form of highly polarized urban spaces especially with regard to basic infrastructure and essential services. These findings are consistent with the increasing available evidence suggesting that since the late 1980s there has been a significant increase in the patterns of social inequality and defenselessness affecting particularly the most vulnerable sectors of the population (see, for instance, IDB (1998); Perry et. al (2003); McGranahan et. al., 2001). In turn, these patterns of worsening inequality constitute one of the most formidable obstacles for the achievement of the Millennium Development Goals, while also representing a major potential source of social conflict. Moreover, the convergence of these negative forces presents a serious challenge for the programmes

promoting private sector involvement in the WSS examined by this project. Let us consider now some of the most relevant indicators.

Unemployment and precariousness

One of these indicators is related to the evolution and changes in the labour market, which allows us to observe the relationship of the population in the case studies with the employment conditions (instability, permanence, quality, etc.). Long-term or intermittent unemployment causes instability in personal and household incomes, which affects their capacity to afford regular payments such as those concerning public services bills. In this regard, London, Athens, Buenos Aires, and Tucuman, showed a rapid increase of unemployment during the 1990s. Although there has been a decrease in recent years, the unemployment rates for these cities are still higher than those recorded before the 1990s, and are well the national average of the respective countries, with exception of Resistencia. Aguascalientes contrasts with the former group due to its low unemployment, which is related to an important reduction of unemployment during the second half of the 1990's, although in recent years the indicators have been worsening in this city too.

Text Box Nº 1. Unemployment patterns

In London and Buenos Aires there have been significant changes that represent an inversion of historical trends: these cities had historically lower unemployment rates than their countries' average, but since the 1990s the situation has been reversed suggesting worsening employment conditions.

In Tucuman, while in the 1970s and 1980s the unemployment rate fluctuated between 10.6 and 8 percent, from the early 1990s there was a rapid increase of unemployment. In 1995 the rate reached a peak 20 percent, remaining stable for a few years until May 2002 when the figures reached 23 percent as a result of the social, economic and political crisis of 2001.

Resistencia in the Argentinean northeast followed a similar path to the other cases in the country, although the rates were lower than in suburban Buenos Aires and Tucuman, and closer to those recorded in the Federal Capital.

If we compare the cases of the Buenos Aires Suburban Area with Tucumán, the former had historically lower unemployment rates than the second, but this situation that has been inverted since 1994.

Aguascalientes has experienced a decline in the rate of GDP, especially in the manufacturing sector, and a steady reduction of public and private investment in job creation since 1999. This has been compounded by inflationary pressures above the national average.

In the case of Athens, there has been a twin process of relative deindustrialisation of the city and growth of the unemployment rate. These changes have taken place in the context of a wider European trend of economic restructuring, and are related to the efforts made by Greece to enter the European Monetary Union (EMU), which required stricter control of public sector employment. Athens had historically low unemployment rates, fewer than 5 percent during the 1970s and 1980s, but these have increased to 8.6 percent in 1991 and 12.2 percent in the year 2000, above the national and European average rates for that year of 11.1 percent and 8.4 percent respectively.

However, unemployment rates are also unevenly distributed across social and geographical sectors. As a general pattern, poverty, deprivation, and unemployment tend to affect the most vulnerable sectors broadly composed of ethnic minorities, the youth, women (in some cases), unskilled workers, and those without property. When these characteristics of vulnerability are combined, people are more likely to be unemployed. For instance, in 1996 20 percent of the unemployed in London lived in the 10 most deprived districts, and 25 percent were under 25 years old. Those who were older, particularly men, had suffered from long-term unemployment (the metropolis has one of the highest proportions of people demanding unemployment benefits in the country). Also, according to the 1991 census non-white Londoners were 2 to 3 times more likely to become unemployed than their white counterparts. In 1997-1998, while the proportion of minority ethnic groups in the economically active population was 27 percent in Inner London and 19 percent in Outer London, their unemployment rates were 47 percent y 32 percent respectively. Recent research suggests shows that despite an sustained economic growth, the situation has substantially worsened since 1997 for the most vulnerable sectors (GLA, 2002).

In 2002 the City of Buenos Aires' unemployment rate was 16.3 percent compared to 24.2 percent in the Buenos Aires Suburban Area, which has a rate above the national average. However, unemployment in the suburban area has also an unequal distribution, with the highest rates observed in municipalities with the least favourable living conditions. Thus, while in the better districts the unemployment rate was 19.7 percent, in the most deprived areas the figure was 26.8 percent. London displays a similar distribution pattern of unemployment. The overall unemployment rate for the city in 2001 was 6.7 percent, above the national average at 5.2 percent. However while Inner London had a rate of 8.9 percent, Outer London was closer to the national average with 5.4 percent. Nevertheless, Eastern Inner London has even higher unemployment, with some boroughs recording rates of 12.3 percent and 11.8 percent.

Chart Nº 5. Evolution of unemployment rates in selected cases (1971-2003)

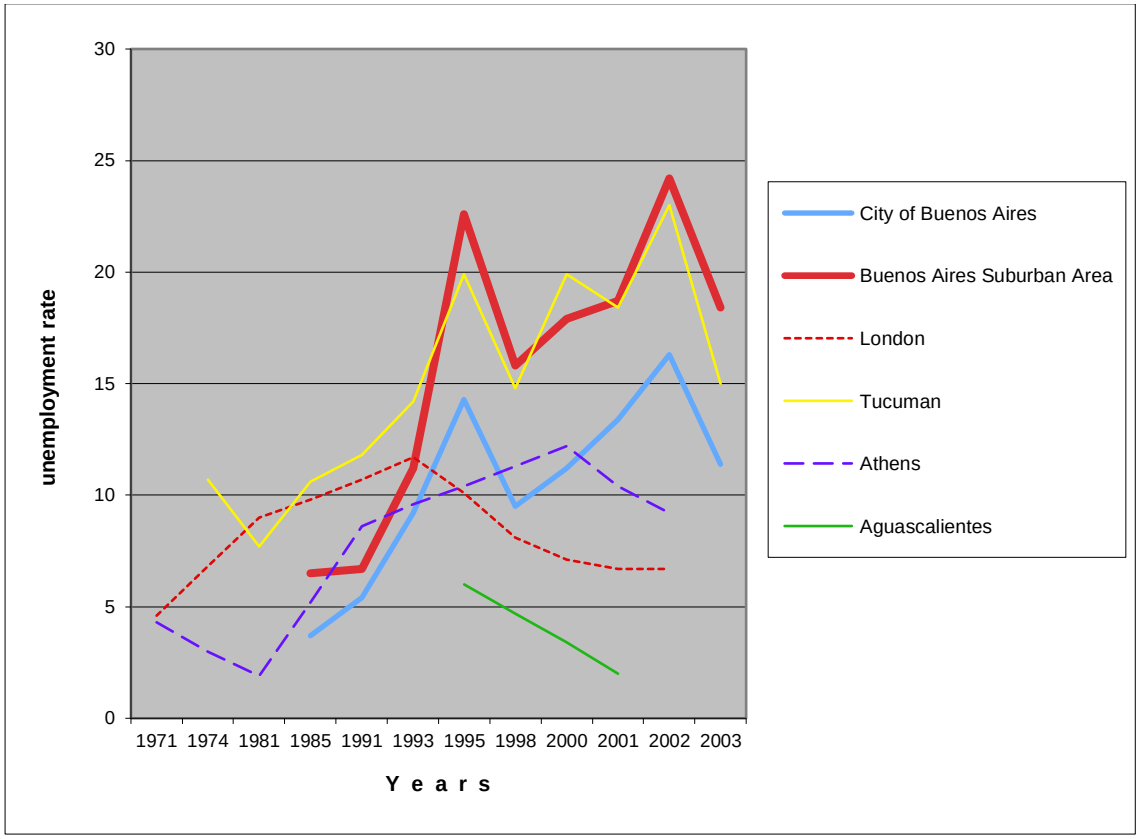


Chart Nº 5 represents the unemployment growth that took place during the 1990s, with rates that in most cases were above 10 percent of the economically active population and more than double that figure in the case of the Buenos Aires suburban area. However, these overall trends hide the fact that unemployment has no homogenous spatial and social distribution in the territories under consideration, with some areas of the city recording higher unemployment rates, particularly where the most vulnerable sectors tend to be concentrated.

From another angle, unemployment as an indicator is just one aspect of the relationship between the population and the labour market, and refers mainly to the lack of employment and the active search for work. However, it does not tell us anything about the type and quality of the employment relationship, for instance if the available employment is relatively stable, well paid and accompanied with social benefits such as a pension scheme or health insurance. In this regard, in a large number of the cases considered in this research there has been a significant increase of job precariousness and informality (in all cases affecting above 50 percent of the employed), mainly un-

registered jobs[34], short-term jobs, part-time contracts, and overtime work. In some cases the labour market is also characterized by important seasonal changes.[35]

Text Box Nº 2. Employment precariousness

In Cochabamba the weight of the informal sector has rapidly increased from 25.7 percent of total employment in 1976 to 36.9 in 1988 and to 47.3 percent in 1996, although it has declined to 40.3 percent in 2001. However, other estimations dismiss the validity of the official date and claim that informal employment accounts for about two thirds of total employment.

In the Great Buenos Aires, during the 1990s there was an increase in underemployment, in the demand for additional jobs by those already in employments, and in the number of employed people without the benefit of pension schemes. Under-employment grew steadily and almost doubled in the last 10 years, from 7 percent in 1993 to 18 percent in 2003. This was compounded by a slow and steady demand for second jobs, reflecting lack of satisfaction with the current occupation or the need to work more in order to achieve more satisfactory income levels. The job demand of those already employed rose from 13.9 in 1993 to 24.8 in 2002, while actual over-employment has reached over 30 percent. In the City of Buenos Aires non-recorded employment showed a dramatic increase shifting from a fourth of the workers in 1993 to a third in 2003. Under-employment also grew steadily, almost doubling in the last ten years; it went from 6.9 in 1993 to 13.2 in May 2003. In the last decade there has been a decrease in the number of company owners and self-employed and an increase in the number of wage- earners.

Aguascalientes experienced a sustained process of economic development during most of the 1990s, becoming an attraction pole for companies and population from other states. There was a steady growth of exporting companies (from 31 in 1992 to 314 in 2001) and of direct foreign investment, which doubled over the second half of the 1990s. As a result of economic diversification, improvement of living standards, labour stability, and job creation, Aguascalientes was able to offset the negative impact affecting the country as a result of the 1994 economic crisis, although the situation started to deteriorate towards the end of the 1990s. Moreover, the overall economic progress has not helped to reverse the pre-existing conditions affecting a large part of the population living in a very precarious situation, and according to data gathered by the private operator running WSS in the city around 70 percent of its domestic users is classified as low income.

Summing up this analysis, high unemployment rates combined with structural unemployment deprive people and households of stable income, which weakens their consumption and payment capacities. Even social sectors that have some saving capacity are affected because these savings are often destined to support unemployed members of the household, which is particularly important in developing countries with little or no unemployment benefits and also in developed countries in the case of illegal workers, which compose a significant share of the population in some cases like Athens. Likewise,

[34] Employment not registered in the social security schemes, sometimes called "black market" employment or undeclared employment, which excludes pension benefits.

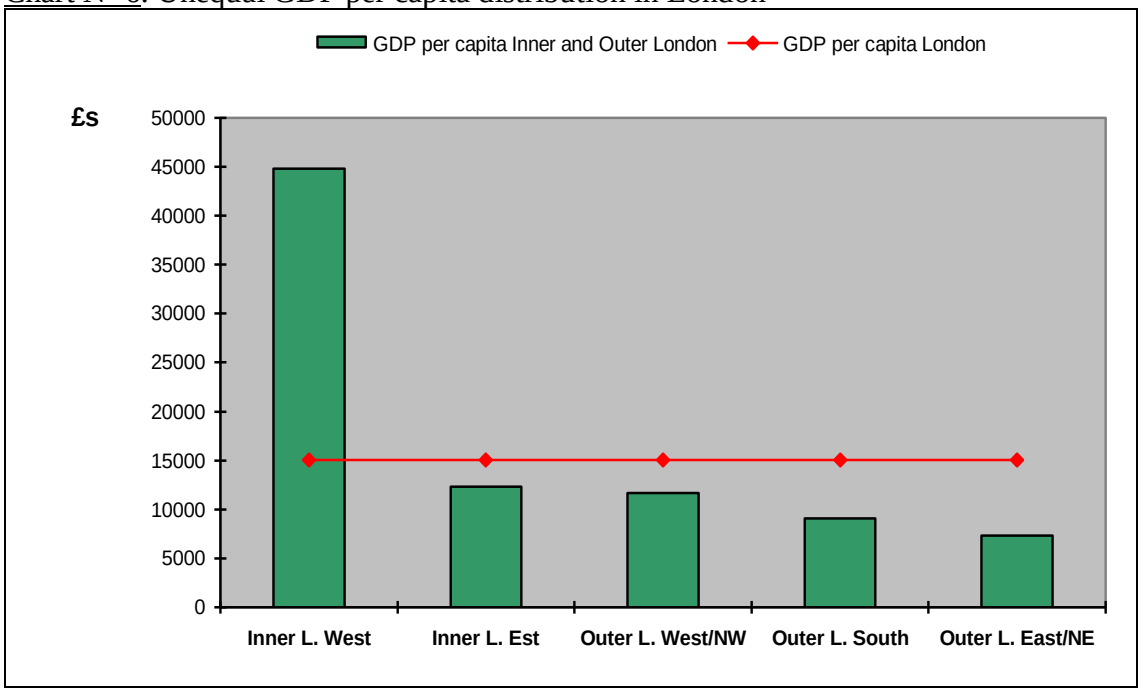
[35] This is the case in the Lakes Region, where the economy is mainly based on tourism and is subject to significant seasonal variations in employment and income.

in the case of unstable or intermittent employment, normally low paid and without social benefits, people and households are under pressure to prioritize the ways in which they use their income, which is normally directed primarily at essential consumption in food and housing (in these cases the rent tends to have a considerable weight in total expenses), while expenses in other important areas such as health, education, and personal pensions tend to be postponed. This has brought us to the discussion of income distribution, which constitutes an indicator of the capacity of households to afford expenses in essential services like WSS and sustain their living standards, which we consider next.

Income Distribution

With regard to income distribution, in the cases of London, Athens, Buenos Aires, Tucumán and Cochabamba there is a clear pattern of regressive income distribution, although with important differences in the intensity observed in each location. The case of London is perhaps the extreme example, where the very high income per capita – higher the national average and one of the highest in the European Union– is offset by the high income inequalities observed among groups (see Chart Nº 6).

Chart Nº 6. Unequal GDP per capita distribution in London



Text Box Nº 3. Unequal income distribution

London has the most polarised income distribution in the United Kingdom. Since the 1970s, income levels have become increasingly unequal and the situation is even particularly difficult for the most vulnerable sectors. While in 1979 the bottom 10 percent of male earners received an income equivalent to 64 percent of the country's income, the figure dropped to 54 percent in 1991; the respective figures for women were 68 percent and 58 percent respectively). After the worst moment of the recession in 1993, there has been a steady expansion of employment but the pattern has been towards further income polarization, which has been more pronounced in the case male earners, and particularly for ethnic minority groups (GLA, 2002).

In the Great Buenos Aires income inequality is even greater: while in 1974 the top ten per cent of the population earned an average household income per capita 9.5 times higher than the bottom 10 per cent, by 1992 the gap had increased to 17.7 times and then to 36.3 times in 2003. And the latest figure represents a significant reduction of the inequality gap, which had reached a figure of 46.4 times in 2002. In comparative perspective, it is also worth highlighting that until 1999 income inequality had been traditionally lower in the Greater Buenos Aires than in the rest of the country's urban centres, but this has radically changed since the year 2000 and the GBA has now a higher inequality gap in the pattern of income distribution. For example, in the City of Buenos Aires the inequality gap has been less intense: the average family income per capita for the top 20 percent in 1992 was 9 times higher than that of the bottom 20 percent, and it was 12 times higher in 2002.

Cochabamba records a better pattern of income distribution than the national average for Bolivia. At the national level, the poorest 20 percent of the population, mostly indigenous, receive 4 percent of the GDP, while the richest 20 percent concentrates 55 percent of GDP, while six out of ten Bolivians live with less than 2 dollars per day. In turn, Cochabamba represents 16 percent of the GNI, has a GDP per capita remarkably higher than the GNI per capita, and per capita consumption in Cochabamba municipality (US$ 2.565) is the highest of Bolivia. However, one of the most serious issues in Cochabamba city is income inequality. In 1988 50 percent of the households received 23 percent of the total income, but their share fell to 18 percent in 1996. Thus, although between 1988 and 2002 there has been an increase in per capita income, the benefits have not been homogenously distributed and have rather favoured the groups with more economic power, in particular those in managerial positions and non-manual workers, while those in the informal or manual sectors have been lagging behind. For instance, the income differential between the top and bottom earners was 3 to 1 in 1988, increased to 6.2 to 1.8 in 1996 and then up to 7.1 to 1.7 in 2002.

Athens experienced a significant decrease of income inequality during the 1980s, when the ratio between the top and bottom average salary levels dropped from 4.2 in 1980 to 2.3 in 1988. In the same period the average top salary level fell by 55 percent while the bottom average salary level gained a 20 percent increase. However, although there is still a relatively low degree of income inequality in the city, since the 1990s there has been an increasing trend towards greater inequality.

In the case of Aguascalientes, as already mentioned, the sustained growth of the overall economy has not been accruing benefits evenly, and according to the information gathered by the private water utility (which had to tackle a growing problem of non-payment) around 70 percent of the households served in the city are classified as low income.

The analysis shows that most case studies record a regressive pattern of income distribution affecting in particular the households with the lowest income and living in the most precarious social conditions, which has increased existing inequalities in the consumption and payment capacity of these sectors. These worsening conditions provide elements for an explanation of the difficulties experienced by many households in the payment of essential public services such as WSS, as it has been observed in several case studies. Nevertheless, despite the mounting evidence indicating increasing income inequality and persistent poverty among important sectors of the population, it has also been observed that in all cases studied the WSS tariffs have been significantly increased at rates several times higher than the overall rates of inflation and wages.

For instance, in Cochabamba, after the concession was granted in 1999 the private company increased water bills by an average 35 percent, which affected especially the poorest users as the minimum charge came to represent almost 22 percent of the minimum wage. As well known, the social and political impact of this policy was catastrophic, contributing to fuelling the mass protests that led to the cancellation of the concession with the private operator and the withdrawal of the entire federal cabinet in March 2000.

In Kenya, a survey carried out in Tala in 2002 found that households were using between 5 and 9 percent of their income to pay for water bills, and the same survey applied to water users in both cities studied (Tala and Nyeri) showed high dissatisfaction with the impact of tariff increases on family income. In Buenos Aires, between the start of the concession in 1993 and 2002 the private company increased water bills by 88.2 percent compared to increases of 7.3 percent in the consumer price index and 8.9 percent in the wholesale price index during the same period. These tariff increases had a stronger negative impact on the poorer sectors of the population, contributing to the worsening inequality gap: in the Greater Buenos Aires, the poorer 10 percent of the population spends in average 9 percent of total income in their WSS bill, while for the average consumer the proportion is 1.9 percent.

In Aguascalientes, after the concession was granted in 1993 the tariff was increased by 10 percent every 2 months during the first year. After the private company had to be "rescued" from default by the government in 1994, the tariff increases needed to make the operation commercially viable were deemed to be politically unfeasible, given the already mentioned fact that over two thirds of the customer base of the company is classified as low income. Also, in addition to the impact of tariff increases that has accompanied the introduction of PSP in the water and sanitation sector, the most vulnerable groups of users have been also burdened by fixed charges to get connected to the network, which are an additional factor of exclusion give the high cost of these charges. In some of the case studies is has been detected that the impossibility to afford these charges to get connected have operated as a limiting factor by discouraging people from demanding access to WSS, thus abating the level of conflict that could have been otherwise expected. We have called this phenomenon "self limiting citizenship", as people seem to forsake the notion of universal right to these essential services.

However, problems of affordability and non payment are not the exclusive preserve of developing country cities, and issues of inequality and deprivation also underscore similar situations in wealthy places like London. In the this city, the WSS tariffs increased by 95 percent between 1989 and 1999, and between 1990 and 1995 the

number of pre-summons notices sent by the private companies to households in arrears rose by 900 percent. In 1994, almost 2 million households (near 9 percent of the total) defaulted on their water bills, but this figure has risen to 20 percent of total households in 2004. According to government estimations, between 2-4 million households are living in "water poverty" given the weight of the WSS bill in their total household income. In this regard, an important development is related to the changes introduced in the policies of disconnection for non payment. In all the cases studied, the companies were initially authorized to disconnect users in case of non payment, but the rising dissatisfaction and opposition to this policy has led to banning this policy in a number of cases. For instance, in England and Wales disconnection was banned in 1997 after mounting pressures from different social and political sectors, including high profile organizations like the British Medical Association. In Aguascalientes, disconnection was banned in 2002 by the provincial Congress, and a similar decision was taken in the Province of Buenos Aires.

Nevertheless, it would not be correct to explain non payment simply by reference to the increasing inequality in income distribution, as the evidence from some cases also suggests that non payment is often the result of such issues as user dissatisfaction and citizen opposition to the policies promoting PSP. In this generalized situation of increasing inequality (high unemployment, employment instability and precariousness, low wages), the pressure from private WSS operators for tariff increases, jointly with the publicity received by the high levels of profit accrued by the private companies, have provoked frequent citizen anger and protest, not just among the poor. For instance, in 1997 the economic regulator OFWAT, in England and Wales, sanctioned an average reduction of 12 percent in the WSS bills for the period 1999-2004, in compensation for the extraordinary profits made by the private companies since privatization. To a large extent, the regulator's decision was the result of a changing political environment, with the election of a New Labour government in 1997 which was aware of and sensitive to the rising dissatisfaction among users because of the rising costs of WSS, the extraordinary profits distributed among the shareholders and business leaders of the water companies, and the delayed investments in much-needed infrastructure renewal.

Going back to the sequence of analytical questions addressed in this section, unemployment and income inequality are closely related to situation of poverty affecting large sectors of the population in most cases considered in the research, which we explore in the following pages.

Poverty

Access to WSS is one of the most important indicators in the strategies adopted by the international community for poverty alleviation and human development. In this regard, the evolution of poverty patterns in the cities studied reflects their association with a high unemployment rate, employment instability and precariousness, and a reduction of individual and household income. As a trend, the evidence suggests that average poverty levels and socio-economic inequality have increased in most cases since the 1990s, although there are important differences in the extent and depth of the process in the

different locations. In principle, the cities can be divided into two groups[36]: a first group composed by Dar es Salaam, Nyeri and Tala Town (Kenya), Cochabamba, Tucumán, and Resistencia characterized by a higher proportion of the population living under the poverty line. The second group includes London, Buenos Aires, Athens, Aguascalientes, Niterói, Limeira, and the Lakes region, which record a lower proportion of the population living in poverty. Let us examine some examples taken from the two groups.

In the first group, the case of Cochabamba is best examined in the context of the overall situation of Bolivia, not only one of the poorest countries in Latin America but also one with high levels of socio-economic inequality and social polarisation. Two thirds of the country's population are of indigenous origin, are largely outside the formal economy, and have a very low coverage of essential services such as WSS and education. Over half of the population (58.6 percent) lives in poverty[37], and six out of ten Bolivians live with less than 2 dollars per day. It is the third poorest country in the Latin American and Caribbean region after Haiti and Nicaragua, and has social indicators similar to the very poor countries and regions of (UNDP, 2004). In this context, the department of Cochabamba has experienced a huge improvement during the last three decades, as the population living in poverty has been reduced from 85.1 percent in 1976 to 71.1 percent in 1992, and then to 55 percent in 2001,[38] below the national average and ranking third in the list of the "better off" behind Santa Cruz (38.0 percent) and Tarija (50.8 percent). Nevertheless, its Human Development Index (0.511) is well below the national average (0.531). Moreover, Cochabamba is also characterized by extreme inequality and polarization and therefore the successful process of poverty reduction has been highly uneven. On the one hand, those areas of the city that already enjoyed better conditions than the average have experienced the greatest improvements in the last few decades, as shown by the fact that they have a significantly lower proportion of the population living in poverty (33.8 percent in Cochabamba municipality, and even better in the Northern quarters like Quillacollo with 30.8 percent, and Colcapirhua with 23.1 percent). On the other hand, the peri-urban areas have remained stable at best, and at worst have seen their poverty levels significantly increased, especially during the 1990s. Figure 1 in Section 3. 3. provides a graphic representation of the spatial expression of inequality in Cochabamba.

The Kenyan cities chosen for the study have very different characteristics in relation to poverty. This also has to be seen in the context of the country's situation,

[36] In order to compare different poverty levels across the case studies we used the proportion of the population living under the poverty line as the initial criterion to group the cities. In some cases we have used the World Bank definition of poverty line (population with a daily income of US$ 2 or less). Complementarily, we have taken into account other indicators for which information is available, such as Unmet Basic Needs (NBI for its Spanish acronym), and the Human Development Index (HDI) elaborated by the United Nations Development Programme, to control the initial classification. In the case of London exclusively he have adopted the index of "deprivation" used in the British literature, which is elaborated on the basis of information about health, housing, income and employment.

[37] Defined as population that lives "in inadequate housing lacking or with poor water and sanitation services, using inadequate combustibles, with low educational levels and poor health care" ("Poverty map 2001", in INE, 2003).

[38] "Poverty map 2001", in INE (2003).

which has significantly worsened since 1990 leading to rising poverty and inequality (Were and Kiringai, 2003), with 58.6 percent of the population living under the poverty line (US$ 2 per capita per day) and 23 percent living in extreme poverty (US$ 1 per capita per day) in 2002. The country ranks 148th in the world's Human Development Index, with 0.448 points, also in 2002 (UNDP, 2004). Kenya is a largely rural country, with only 35 percent of the population living in urban areas, 60 percent of which live in precarious or poor settlements characterised by unplanned development and very poor access to basic infrastructure such as WSS. In this context, Nyeri is located in the Central Province, which records the best conditions in the country with only 31 percent of the population living under the poverty line compared with 58.6 percent at the country level. Nyeri itself has a slightly better indicator with 30 percent of the population living in poverty. Tala Town, in turn, is located in the Machakos district, Eastern Province, which has a much worse situation with 58 percent of the population living under the poverty line, slightly below the country's average. Machakos has an even higher proportion with 60 percent (World Bank, 2004).

Tucumán and Resistencia in the Argentinean Northern region have similar patterns in the evolution of poverty levels to the Greater Buenos Aires, though the magnitudes are higher in the Northern provinces. In Tucumán, the proportion of the population living under poverty and extreme poverty (with a daily income of US$ 1 or less) was 62 percent and 27.1 percent respectively during the second half of 2003, and Resistencia recorded even higher proportions with 65.5 percent and 31.5 per cent respectively. However, certain sectors of the Buenos Aires conurbated are have levels of poverty and extreme poverty similar or even higher to those observed in Tucuman and Resistencia. For instance, in May 2002 70 percent of the population in the GBA2 (the outer peripheral ring of the BAMA) was living under the poverty line, and 30 percent in extreme poverty.

Within the second group of cities presenting lower levels of overall poverty, we have London that is not only the wealthiest city in the United Kingdom, but it is also one of the most important capitals of the European Union and a global city in the network of business and financial markets. However, the metropolis houses some of the most deprived areas in the United Kingdom, and has also the highest inequality levels, in one of the most unequal countries of the European Union. In 1999 London had five of the country's ten most deprived areas, and 13 among the worst 20 (Matheson et. al., 1999). Inner-London East concentrates the highest levels of unemployment, affecting mainly the most vulnerable sectors, and also experiences appalling conditions of widespread poverty especially among the elderly and children. According to data published by the London government in 2002, 36 percent of children in Inner London live in poverty, compared to 25 percent in the whole metropolis and 19 percent in Outer London. The figure increases to 53 percent when housing costs are taken into account, as London has also the characteristic of having the highest living costs in the country (GLA, 2002). Another indicator of deprivation used in the British context is the proportion of homeless households. In 1994/95 London outnumbered the rest of the country with 9.5 homeless households per thousand, against 6.1 per thousand in the country at large. In Inner London the figure was 13.8 homeless households per thousand. In March, 1998 there were 29,600 homeless households in London. Although this figure was almost double that the number of homeless household recorded in 1986, it had expressed a significant improvement

compared to the highest peak reached in 1992 with 41.800 households in these conditions. However, the situation has rapidly deteriorated and by 2002 the figure had jumped to 52,700 households, which represents an 88 percent increase in homelessness since 1997 (Focus on London, 2003; see also GLA, 2002).

The evolution of poverty in the Greater Buenos Aires in the last decade has taken the form of a sudden process of mass pauperisation in the metropolis. The levels of poverty and indigence[39] evolved from 16.1 percent and 3.3 percent respectively in 1994 to 33 percent and 10.3 percent in 2001, and then to a staggering 46.2 percent and 18.9 percent in the second semester of 2003, although the latter figure represents an improvement from the levels observed during the first semester of 2003 when 52.3 percent of the metropolitan population was living under the poverty line. However, these overall figures hide intra-urban inequalities given that the impact on the most vulnerable sectors, which are located in the peripheral areas of the city, has been much more extreme. Towards the end of the year 2000, for instance, while in the Greater Buenos Aires as a whole the indicators for poverty and extreme poverty were 28.9 and 7.7 percent respectively, in the City of Buenos Aires the figures were 9.5 and 1.8 percent. Then, you can observe the values increasing when we move from the centre to the periphery: in the first ring of suburban districts the figures were 25.1 and 6.9 percent, and in the second ring 43.2 and 11.7 percent. Figure 1 in the next section helps to visualize this pattern of increasing inequality and poverty from the wealthier core to the extremely poor peripheral areas.

The overall social conditions in the Brazilian municipalities included in the study are very good according to the indicators, which related to the fact that these cities are located in the states of Sao Paulo and Rio de Janeiro which have the highest GDP per capita, after the Federal Capital Brasilia, well above the national average. However, although Niterói and Limeira present high scores in the Human Development Index (HDI) and have a favourable social-economic scenario, both reflect the particular features of a country with remarkable social contrasts.[40] In the early 1990s, Niterói had 6 percent of the population living in precarious conditions similar to those prevailing in the shanty towns (favelas),[41] and 34.4 percent were living in poor housing conditions, which was reflected for instance in the situation of WSS: Around one quarter of the households (23.4 percent) were not connected to the networked water supply, while approximately one third (34.2 percent) had no access to sewerage. In the case of the Lakes Region, also in the State of Rio de Janeiro, over the last decade there has been a chaotic growth of

[39] In Argentina, the measurement of poverty is done through the "poverty line methodology", "consisting in establishing, on the basis of household income, if households have the capacity to meet –through the purchase of goods and services– a bundle of basic needs (food, clothing, transportation, education, health, etc.) that are considered essential". The concept of "extreme poverty line" applies to households whose income is not sufficient to cover basic feeding needs, literally, those that cannot afford to purchase "a food basket that can satisfy minimum levels of energy and protein needs" (INDEC (2004).

[40] In 2002, Limeira scored a HDI of 0.814, ranking 90th among over 5000 Brazilian cities. Niterói had the highest HDI score in the state of Rio de Janeiro and ranked among the fourth best in Brazil.

[41] IBGE (1991). The municipal government considered that the census figures about the proportion of Niterói's population living in slums were underestimated (PMN, 1994). The indicator was not included in the 2000 Census.

irregular settlements, particularly in the municipality of Cabo Frio. This has been reflected in some social indicators for this municipality, which is the only one in the sub-region with an infant mortality rate above the state's average at 27.1 per thousand live-born babies, and in contrast with the national average of 22.5 per thousand (CIDE, 2003).

Finally, to complete this second group of cities, Athens is different from the other cases given its greater degree of social homogeneity and lower income inequality, which had been attributed in part to the central role of the family in promoting a high degree of social cohesion, providing support for unemployed youngsters, and underscoring the presence of a strong middle class. However, rising levels of unemployment compounded by the immigration flows –especially because of the illegal immigrants living with part-time jobs and low income levels– is creating pockets of poverty and homelessness in the inner and northern parts of the city. This is affecting the long-term stability of the city's remarkable social equality and homogenisation patterns.

Summing up

The initial classification of the cities in two groups differentiated by their overall levels of poverty and extreme poverty has been broken down through the analysis of the cleavages and processes of intra-urban differentiation, which reveals the existence of important pockets of poverty and deprivation even in the wealthiest urban areas under consideration. Certain areas in the Buenos Aires conurbation and in the relatively wealthy Brazilian municipalities record levels of poverty and extreme poverty similar to those observed in the poorer cities of Tucuman, Resistencia, and some parts of Cochabamba have very similar conditions to those found in the poor districts of Kenya and Tanzania included in the study.

Regarding poverty patterns, there has been a clear trend of deterioration during the 1990s, including in cities like Athens which had enjoyed high levels of social cohesion and relative well being, although there has been some recovery in the last few years in some cases like Londres, Buenos Aires, Tucumán, Resistencia, and the Kenyan and Tanzanian cities. There is also a clear pattern of increasing inequality and polarization, which can be observed in most cities even where overall poverty has been declining, like in Cochabamba. In most cases, the most deprived sectors of the population tend to concentrate in the worst serviced parts of the urban space and record the highest levels of unemployment, employment instability and precariousness, and income inequality.

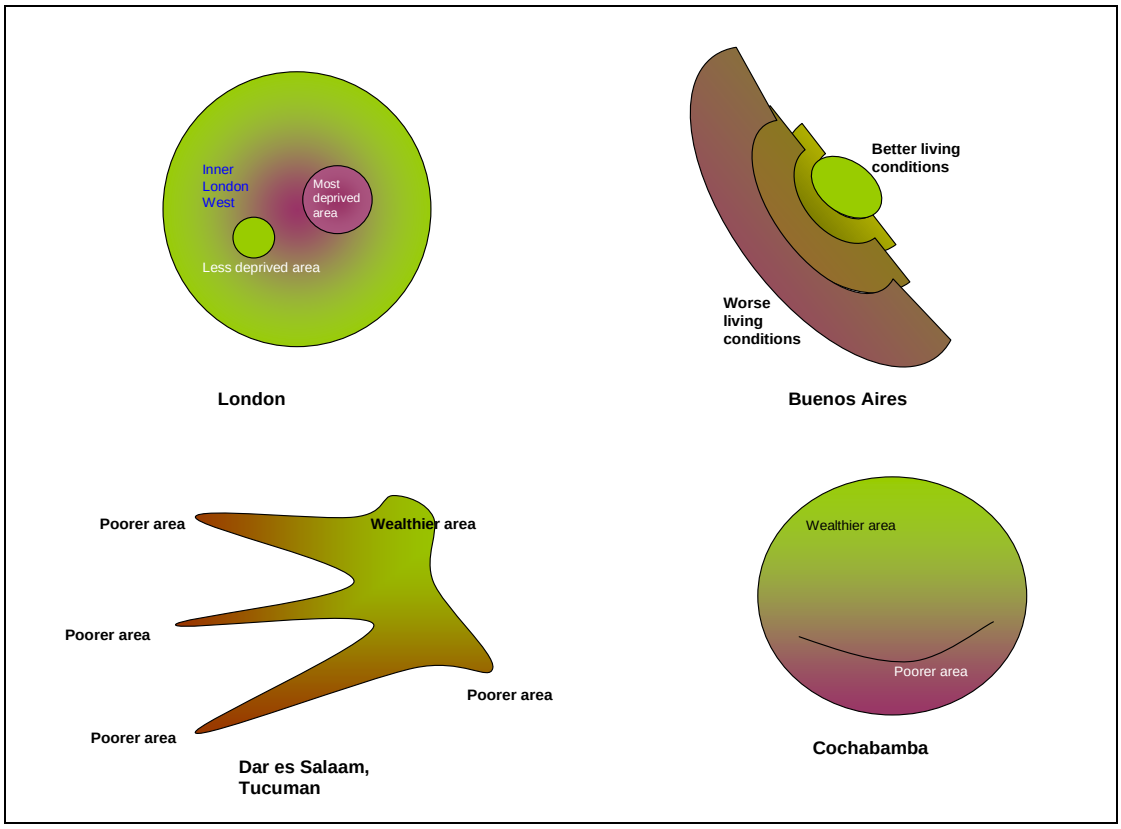
At the same time, these social conditions are often worsened and magnified by the political and economic instability generated by social confrontations among the most powerful social sectors, as it has been recently the case in Argentina. These tensions have been also exacerbated by the increasing integration of these countries into the world market, and by the processes of deregulation and liberalization of the national economies now exposed to the fluctuations and crises generated by increasing competition, and largely uncontrolled global capital flows. The process of PSP expansion in the water and sanitation sector is part and parcel of these global transformations, and we are exploring here some of the impacts that these processes are having at the level of regions, cities, and neighbourhoods.

Urban-spatial structures and living conditions

The urban-spatial characteristics of the case studies are closely related to the above examined patterns of inequality and polarization, which find expression on high levels of intra urban differentiation and segregation regarding the social and material living conditions. In different degrees, and keeping in mind the paramount differences existing between rich European metropolises like London and extremely poor African municipalities considered in the study, there is a common pattern of socio-spatial segregation within the same urban context. Nevertheless, the particular spatial expressions assumed by the processes of socio-economic inequality and polarization are worth considering owing to the specific challenges they pose for the development and maintenance of WSS networks.

In this regard, we have developed a hypothetical reconstruction of three basic patterns of spatial segregation derived from the case studies: a first type characterized by the concentration of poverty and deprivation in the urban centre, which is surrounded by less deprived areas. This pattern can be identified in London, where part of the core centre of the metropolis (Inner-London East) records some of the highest deprivation levels in the country, and in Aguascalientes, where an inner city areas have a much lower socio-economic profile than the suburbs. The second pattern identified consists of precisely the opposite situation: a centre that concentrates the best living conditions surrounded by concentric rings which become poorer as they turn away from the centre, which fits well the case of Buenos Aires). The third pattern follows the structure of a bipolar partition of the urban space, which in the case of Cochabamba assumes the form of a polarization between the wealthier northern quarters and the extremely poor southern areas. Finally, there is a fourth pattern of spatial organization that can be called branching off, where the poorest settlements are located along the main transport and services lines like railways and highways, which is the case of Dar es Salaam and, to a lesser extent, Tucumán. Figure Nº 1 represents these typologies.

Figure Nº 1. The spatial structure of urban inequality



Nevertheless, the spatial expression of social inequality is far more complex and pockets of poverty and deprivation coexist with the wealthier neighbourhoods, as it has been actually captured for the London example. In the case of Buenos Aires, despite the overall concentric pattern of increasing deprivation towards the edges of the urban area, pockets of wealth and extreme poverty coexist throughout the metropolis.[42] This is also reflected in the patterns of quality and level of coverage of essential services such as WSS, which are structured around the pre-eminence of the Northern quarters over the Southern neighbourhoods, of the centre over the periphery, and a clear dominance of the main axis of urbanisation on the remaining spaces (Torres, 1999).

As pointed out earlier, London presents an urban configuration whereby the most deprived areas tend to be localized in the central part of the city, in particular Inner London East. The complexity of this urban configuration can be hinted by considering that these highly-deprived areas coexist side by side with some of the wealthiest quarters in the European Union located in Inner London West. In fact, this coexistence of polar

[42] The National Institute of Statistics and Censuses (INDEC) has grouped the Great Buenos Aires districts into four categories (GBA1-4), ranked according to decreasing socio-economic level. See Messere and Hoszowski (1994), and Lorenzetti and Morano (1994).

situations of wealth and deprivation can also be observed throughout the different districts of the British metropolis.

As described earlier, Dar es Salaam presents a different configuration with an area concentrating the best living conditions, basically in the commercial and business district, surrounded by poorer settlements located mainly along the transportation and service corridors. The rapid population growth in this city is attributed to the proliferation of these population settlements which are unplanned, unserviced, affected by inadequate or non-existent ways of access, and a chronic absence of basic services such as WSS, urban drainage, and solid waste management.[43] A large part of the population obtains its water supply from informal providers, mostly in conditions of poor quality and highly expensive prices. It is estimated that 75 percent of the population lives in illegally occupied areas, where about 65 percent of the newly created settlements have been built. In turn, as illustrated in Figure 1, the spatial expression of urban inequality in Cochabamba has taken the form of a highly-polarized concentration of wealthier settlements in the historical centre and the Northern quarters. As a result, the agricultural land towards the North of the city, the most suitable for agriculture, has been rapidly transformed into residential areas. At the other end, the human settlements living in the most deprived social and material conditions, largely unconnected from the flow of urban goods services including WSS, are concentrated in the peripheral areas to the North-west and South-west of the city. In the case of Athens these patterns of high spatial segregation are much less pronounced, and the city ranks exceptionally well in almost all indicators of social equity which makes the urban area more homogenous in spatially terms, at least in the sense that it does not present marked contrasts or a clear separation of settlements by class or ethnic cleavages.

From another angle, these overall trends are reinforced by the processes of relocation of the workforce at the local, regional and global levels. In most of the cases analyzed here poor migrant populations, unskilled, with weak or null social and material support, are increasingly occupying the most unstable and lowest paid jobs. In most cases, they settle in land illegally occupied or in peripheral urban areas with inadequate or non-existing essential services, but they can also be found at the heart of the world cities.[44] The analysis of the spatial ordering of the population in each of the cities studied in this project can help to make more understandable the trends assumed by the forms of PSP in the water and sanitation sector. In particular, this comparative assessment casts lights on the requirements and constraints facing the expansion and maintenance of the WSS networks, their renewal, and their service quality levels, which in the last analysis concern

[43] The sewerage system only covers the small area of the commercial and business district. In the rest of the city sewage is collected by tankers wherever the roads allow access to the neighborhoods, which is often not the case in the poorest areas.

[44] In the City of Buenos Aires (according to the Chamber of Real State Owners of Argentina) the number of illegally occupied properties has doubled in the last 10 years, from 6.000 to 12.000, and the occupying populations has grown from 70,000 to 150,000 people, most of them living in poverty. According to data from the INDEC, between 1991 and 2001 the number of people living in shanty towns in the City of Buenos Aires has also doubled to reach an estimated 120,000 people. "In total, in the capital city there are 341.405 homeless people (12.3% of the population), according to the Housing Commission, Congress of the City of Buenos Aires", and this is a process in expansion (Clarín, section "La Ciudad", page 40, 29/07/2004).

the conditions and obstacles for the production and reproduction of local and global capital.

In this connection, the overall pattern observed in the case studies shows that the areas where the poorer sectors tend to be concentrated have poor or null provision of water supply and, especially, sanitation services, which has a very negative impact on the sanitary and environmental conditions of these groups. Often, the official figures of WSS coverage hide the fact that although poor neighbourhoods may be connected to the networks, service quality is very poor owing to a range of factors including low pressure, intermittent supply, leaking pipelines, pollution of the water supply by raw sewage, among other problems. In addition, the mainstream policies based on the assumption that the poor "can" and are "willing to pay" –often based on opinion surveys–, neglect the mounting evidence consistent with the findings of this project showing the structural difficulties affecting large sectors of the population that cannot afford to pay for WSS at a price that can make the business attractive to global private investors and simultaneously generate the funding needed for infrastructure expansion and renewal. In fact, the evidence demonstrates that the share of the population that cannot afford to pay for these services is growing owing to the worsening conditions of income inequality, poverty and deprivation observed in most cases, which presents a very difficult obstacle for the WSS programmes based on the expansion of PSP as the solution to provide services to the poor.

From another angle, access to WSS is one of the key components of MDGs oriented at poverty eradication and human development. Inequity in the distribution of these services is an effective indicator of the degree of social segregation and poverty. In the case of water supplies, inequity can be expressed in terms of the differential volumes of water consumed per-capita, in the quality of the service supplied, and in the weight of the cost of these services in the total household income. In this regard, the consumption of the poorest sectors tends to be much lower than that of the richest population, following a pattern where the higher the income, the higher the per-capita consumption of water. However, the impact of the tariff on household income is many times higher for the poorest sectors than for the well-off, and as a trend they receive poor quality water.[45]
Although these are well established facts, it is important to emphasise the chronic character of the problem and the fact that these trends which have existed for decades, often under public sector monopoly of WSS, are not being reversed and are rather exacerbated by the particular model of PSP expansion that has been implemented worldwide since the 1980s. Private operators need to focus their investments in ways that they can secure a return on capital for their shareholders, which is their main priority, and therefore expanding the networks to the poor has clearly nor being part of their strategy, with few exceptions that tend to confirm the rule. They would, admittedly, only expand the services to the poor if this is agreed in the original contract, but too often they have

[45] For example, studies carried out in the Mexico City Metropolitan Area during the 1980s and 1990s showed that in the poorest neighbourhoods per capita consumption may be as low as 3-4 litres per day during certain periods of the year such as the peaks of the rainy and dry seasons, while in middle class neighbourhoods the rates reach over 1000 litres per capita per day during the same periods. In addition, the water sold to the poor is often uncontrolled and of dubious quality, while the prices they pay are several times higher that in the richer areas of the city. This is a common pattern in many developing country cities.

not lived up to the letter of the original contracts, particularly in this precise aspect related to infrastructure expansion to cover the most deprived population. Even if the contract stipulates that this should be done, in the absence of proper regulation and public control non-compliance by private providers has been the pattern, in most cases studied.

For instance, in Buenos Aires and Cochabamba the expansion of the networks and the investment in assets renewal, maintenance, and improvement of service quality has been focused mainly on the areas offering the greatest profitability. The problems faced by the companies, whether private or public, have been mainly in the areas with low payment capacity.[46] In both cases, the explanations for the problem of non-payment have been the lack of a "payment culture" among the population, which often justifies the punitive action of disconnecting or otherwise limiting the water supply to these sectors, as a sort of moralising device aimed at fostering the internalisation of what is assumed to be an absent culture. Unfortunately, penalizing non-payment with disconnection and similar tactics to induce a customer discipline among users such as reduced or intermittent flows or simultaneous disconnection of other essential services (e.g. electricity) has brought about significant social and political problems, not least because of the public health implications of such measures, in particular for the poorest sectors of the population. We have approached the topic of public health and health inequality, which we address next.

Health inequality[47]

Another crucial characteristic of the case studies is related to the prevalence of health inequality. Looking at population health indicators it is possible to observe a strong association between health patterns and the material living conditions prevailing in the cities, which as already described are generally characterized by processes of social and spatial segregation often translated into highly polarized concentrations of wealth and deprivation. Within this context, one particular expression of health inequality is that derived from the conditions of socio-economic and spatial inequality in the access to essential WSS and the resulting impact of water-related diseases on the population. However, other more diffusely distributed threats and risk to human life also affect particularly the most vulnerable sector of the population.

In this connection, a large proportion of water-related risks and threats to human health are linked to or even caused by the way water resources are developed and managed.[48] This is especially true of vector-borne water related diseases such as malaria and schistosomiasis, but it also applies to broader health concerns such as "nutritional status, exposure to agricultural pesticides and their residues and accidents/injuries" (WHO, 2003). In this regard, the link between water resources management and public

[46] The municipal water company SEMAPA attained a coverage level of slightly over 50 percent by prioritizing a "pro-rich" connection policy and tariff system. The poor population is therefore obliged to buy water from informal sellers or alternative organization systems of water supply.

[47] By Emilio Crenzel

[48] This and the following paragraph are based on Castro (2003b).

health encompasses wider considerations encapsulated in the concept of environmental health, which refers to the impacts of chemical, physical, and biological agents on human life and health (Sims and Butter, 2000; WHO-Europe, 2003). It is estimated that between one fourth and one third of human morbi-mortality is directly attributable to environmental risk factors, among which water-related diseases are paramount. Moreover, the impact of these diseases is much greater in the poor areas of developing countries, and they have a disproportionate impact on young children and women. These factors are known to have also an impact on many other diseases that are loosely connected with environmental conditions, such as genetic and sexually transmitted diseases such as HIV which compound the need for WSS by further weakening immunity and reducing the scope for breast feeding (to prevent HIV transmission). Consequently, the actual weight of household-related environmental risks derived from poor air, food, and water quality may be grossly underestimated (Sims and Butter, 2000; Smith et. al., 1999; UN et. al., 1998; UNCHS, 1996).

Most of the water-related environmental risks mentioned above are part of a traditional and relatively well-known pool of diseases that continues to be one of the main threats to human life and health. However, there is also an emerging group of water-related environmental threats that are much less understood, have the potential to become widespread and have a far-reaching impact on environmental health in the near future. These diseases emerge "either because they are newly recognized or because their importance increases [which] may be due to the micro-organisms themselves evolving, to changes in the way we manage water resources and supplies; changes in the tools and methods used to study the organisms and the health effects they cause; or due to changes in the human population itself" (WHO-Europe, 2003). While the impact of "old" diseases has been significantly reduced or altogether removed in most developed countries, developing countries suffer from both the old diseases associated with poverty and deprivation and the newly emerging threats derived from modernization.

Often the available information does not allow a rigorous demonstration of the specific correlation between the proliferation of diseases and the quality of drinking water or the lack of sanitation facilities. However, in most developing country cases the most vulnerable sectors of the population tend to be located in illegal or irregular settlements characterised by poor housing, deprivation, low or null access to safe WSS, poor hygienic education, and a very degraded environment often close to industrial and municipal waste dumps and polluted water courses. This situation is compounded by the frequent absence or insufficiency of regulation and control over the proliferation of open air waste dumps or the discharge of untreated sewage into water sources. Moreover, poor regulation of PSP-run water utilities has meant that the fresh investment that was expected to improve the much-needed safe collection and disposal of wastewater in these countries, normally agreed in the original concession contracts, has often not materialized and the problem continues to worsen in a context of increasing social and economic polarization.[49]

[49] As a general trend, private operators are mainly interested in "clean" water projects and investment in wastewater collection and treatment systems is lagging well behind. On the lack of compliance of private operators with investment commitments as agreed by contract in our case studies, see Azpiazu and Schorr, Article 1 in this publication.

The indicators

Let us examine now some indicators of the link between overall material conditions, access to WSS, and health inequality to illustrate the analysis. The situation in Argentina is a case in point given the clear link between the far-reaching and rapid process of liberalization and expansion of PSP in most economic activities implemented during the 1990s and the dramatic social polarisation that ensued. For instance, looking at examples from the access to basic amenities in the household, by May 2002 98.5 percent of the population in the Federal Capital (Buenos Aires City) had an internal bathroom in their homes and access to networked WSS, while in the peripheral areas of the metropolis housing the poorest sectors of the population 31.6 percent of the households lacked the basic conditions for the safe disposal of human waste.[50]

These indicators are related to epidemiological factors. In a national context of declining general and infant mortality rates since the early 1980s, in 2002 the conurbated area of Buenos Aires recorded a gross mortality rate of 7.8 per thousand and an infant mortality rate (for children of less than a year of age) of 15.7 per thousand (with similar figures in the areas inside and outside the coverage area of the AASA concession, the private provider of WSS), whereas in the Federal Capital in the same year, the gross mortality rate was 11.1 per thousand and the infant mortality rate, 9.4 per thousand live births (MSyAS, 2000).

This decline in the infant mortality rate has led to some mistaken interpretations that explained it as the result of the improvements introduced in the WSS through the concession of the system to the private operator AASA in 1993.[51] However, in fact the trend in the infant mortality rate has been observed in the urban districts both inside and outside the area given in concession to the private operator. In addition, the declining trend in the infant mortality rate is part of a trajectory that can be traced back to the early 1980s, over one decade before the concession contract with AASA was signed.[52]

The indicators for the province of Tucumán are similar to those of the poorest areas of the Buenos Aires conurbation. In 1991, 24 percent of the households lacked flush closets or toilets (INDEC, 1993: 48). and ten years later, in 2002, the conditions had remained almost unaltered, with households lacking this essential facility representing 22.5 percent of the total (INDEC, 2002). In the period 1970-2002, the gross mortality rate decreased only from 6.9 to 6.1 per thousand, whereas in 1999 the infant mortality rate for children under five years old was 22.5 per thousand live births, a third higher than the

[50] In Argentina, the lack of a bathroom in the house is one of the indicators of the "Unsatisfied Basic Needs (NBI)" index, which also includes the quality of housing, overcrowding, school attendance by children, educational level of the heads of household, and the presence of more than three unemployed members of the household for every employed member INDEC (2002).

[51] See the claims made in this regard by Galiani et.al. (2002). The World Bank cites this article to support the case for PSP (see World Bank, 2003, p. 168). For a critical assessment of the argument presented by Galiani et. al., see Lethbridge (2002).

[52] See "Infant mortality rates, historical series", INDEC (2002).

national average at 17.6 per thousand.[53] At the same time, in the areas housing the poorest sectors of the population water-related diseases are widespread (Calcagno, et. al., 2000: 16).

The relationship between material living conditions and epidemiological indicators, and the independence of these indicators from discrete processes such as the introduction of PSP in the provision of water and sanitation as revealed in the case of Buenos Aires, is also made apparent in the analysis of the experiences of the Brazilian cities of Limeira and Niterói. In these cases, there has been a sustained decline in child birth and infant mortality rates in recent decades.[54] Although the process is more or less contemporaneous with the introduction of PSP in the provision of water and sanitation services, the fact is that the decline in the mortality rates follows a similar trend to the country's average, together with the stagnation of fertility rates and the increase in life expectancy also observed in these cities (Ministry of Health of Brazil, 2003; Fundação Seade, 2003).

In Cochabamba, where the average infant mortality rate in 2001 was 78 per thousand (INE, 2003), the conditions of social polarization are crudely manifested in the life expectancy patterns. In the wealthiest quarters to the Northeast of the city people have a life expectancy of 67 years, while in the deprived Southern neighbourhoods the figure is 47 years. Likewise, whereas the infant mortality rate in the North is 45 per thousand live births, it reaches 145 per thousand in the South, where the disease and mortality patterns (gastro-enteritis, diarrhoea and other infectious-contagious diseases) are associated with the consumption of low quality water, lack of adequate sanitation, and severe conditions of malnutrition.

Nyeri (Kenya) shows an improvement in the indicators of access to drinking water and the simultaneous decrease in adult and infant mortality.[55] But at the same time, sanitary deprivation, insufficient treatment of wastewater and insufficient bacteriological controls, and a poor use-of-water tradition with a view to preventing water-related illnesses prevail. Factors such as the use of water, storage, sanitation, personal habits, cultural beliefs and altitudes contribute to the spread of water-borne diseases (Muthuri, 1995).

At the other extreme, Dar es Salaam has experienced a severe deterioration in the average living conditions of the population. The evidence shows that a number of serious public health trends have emerged during the 1990s expressed in an upward trend from 46 percent to 62 percent in the impact of total diseases between 1991 and 1995, while

[53] Sources: for the period 1970-1980, Medina (1984: 76), based in data of MSyAS (2000). For the year 2000, MSyAS (2000). In 1999, the province of Chaco recorded an infant mortality rate of 29 per thousand children (MSyAS, 2000).

[54] In Limeira, the infant mortality rate dropped from 30.82 per thousand in 1990 to 10.85 in 2002. In the same period in Niterói this rate declined from 24.20 per thousand in 1990 to 17.38 in 1998 (CIDE, 2003; Lima, 2003; Roberval, 2003).

[55] In 1995 a survey found that Nyeri district had a relatively low rate of morbidity with only 13.7 percent of the population reporting sick per annum. This was attributed to the accessibility of health care. Infant mortality in Nyeri district was 35 per thousand in 1995, compared with a national average of 62 per thousand. This low mortality rate is attributed to relatively high incomes, extensive coverage by immunization programs, and relative accessibility to health care facilities (Gauff, 1997; Muthuri, 1995).

water related diseases increased their share from 8 per cent to 12 percent of total diseases between 1991 and 1995. It is also estimated that water-borne diseases may constitute between 15 and 20 percent of recorded diagnoses in Dar es Salaam, and in the poorest households in the areas of Temeke, Ilala, and Kinondoni this is reflected in the infant mortality rate (140 per thousand versus 85 per thousand of the national average infant mortality rate, and against 50.6 per thousand of the city infant mortality rate). The types of disease considered here are strongly associated with the conditions arising from poor water quality, inadequate sanitation, cross contamination of water supply (most commonly shallow wells) by dispersion from pit latrines, leakage within the sewerage system, and exposure to recurrent flooding (Tanzanian Ministry of Health, 2003). This is compounded by the growth of the HIV/AIDS epidemic which has critical economic, social, demographic and cultural implications for the future of the country. In 1997, the estimated number of people infected was 1.4 million (9.42 per cent of the population), and in many communities AIDS now is the principal cause of premature death. Unfortunately, the health system has crumbled under the pressures of budget-constraining policies and an expanding urban population (Hante, 2003).

From another perspective, although the public health conditions reach extreme levels in the poorest areas of developing countries, it would be a mistake to limit the analysis of health inequality and urban polarization to developing countries. In this regard, the case of London is a good illustration of the worsening social inequalities that also take place in the wealthiest metropolises of the world. While the mortality rate in the well-off neighbourhoods of the British capital remained relatively stable between 1981 and 1991, some of the poorest quarters experienced an increase of 8 percent, a contrast that was even more acute with infant mortality rates as in the most deprived Inner London boroughs rates were almost double than in some Outer boroughs. Data for the year 2000 show an overall improvement in the situation of the metropolis, particularly in Inner London. Regarding the infant mortality rate, it has experienced a sharp decline from 10.2 per thousand live births in the period 1981-83 to 6.1 in the period 1993-98. However, in the latter period the intra-urban differences were striking with the infant mortality rate ranging from 3.7 per thousand in the City of London to 8.9 per thousand in the borough of Hackney, while seven Inner London boroughs were among the ten boroughs with the highest infant mortality rates in the capital. Also worryingly, Tuberculosis (TB) has re-emerged as a serious health problem during the 1990s, and occurrences are several times higher in the capital than in the rest of the country. It affects particularly children, the elderly, the chronically ill, homeless, and those living in deprivation, and is concentrated in areas with higher proportion of minority ethnic population and immigrants (GLA, 2002: 72-3, 143).

In that sense, in Aguascalientes in Mexico, the reduction of water-borne diseases corresponds to the improvement of the material living conditions resulting from the economic development and the application of control and improvement programmes for the quality of water, like the "Clean Water Program" (Empresas del Agua y el Saneamiento de México, 1995; INEGI, 2000). This is reflected, among other indicators,

in the reduction of the infant mortality rates associated with water-related diseases, which are lower than the national average.[56]

At one of the extremes, the case of Finland combines the favourable living conditions, inclusive social policies, an adequate environmental regulation with the lowest adult and child mortality rates associated to water-borne diseases and the best epidemiological indicators for mortality of children under five years of age (5 per thousand) as well as the low child mortality rate (0.48 percent), slightly lower than Athens' (0.5 percent).

Conclusions

The comparative analysis of the demo-geographic and socio-economic structures and processes identified in the cities covered by the study provides substantive evidence for the assessment of the challenges and opportunities facing the introduction of PSP in the water and sanitation sector. In particular, it casts light on the conditions and constraints facing the expansion of WSS to the poorest sectors of the population, and contributes to make a more objective evaluation of the actual feasibility of achieving the MDGs through the expansion of the types of private sector participation promoted by mainstream WSS policies since the 1980s.

The cases studied in this research involved highly heterogeneous urban centres, which we initially classified according to population size into three distinctive groupings: large metropolises, medium-sized cities, and small urban centres. However, our main research interests led us to explore the inter-city and intra-city heterogeneities in terms of their demographic and socio-economic characteristics. This was done through the analysis of basic socio-demographic variables such as sex and age distribution, population density, and living conditions, as well as socio-economic characteristics such as the diversity of economic structures characterizing the cities, their different employment patterns, unemployment, poverty, income distribution, and water-related health problems.

Despite the important differences between London, Buenos Aires, and Athens, they share some common traits like a certain degree of demographic stabilisation, with a significant number of one-person households, an important presence of economically active population and elderly people, and a process of suburbanization of well-off sectors of the population in search for better living conditions. In the case of the medium-sized cities there is a pattern of increasing metropolization fuelled by strong migratory movements and by the integration of peri-urban areas. In contrast with the metropolitan areas, these cities tend to house a younger population and a larger proportion of multi-family households.

From another angle, we also explored the intra-urban cleavages resulting from processes of social segregation and polarization, which in different degrees were found in all our case studies. The evidence shows how these different cities are influenced by the mainstream trends of the world economy, with an expanding services sector, a

[56] While at the level of the country the mortality rate for diarrhoeal diseases among children under 5 years old in 2000 was 23 per thousand, in Aguascalientes the rate was 17 per thousand (CNA, 2004).

simultaneous decline of primary and secondary activities, and a radical re-structuration of the labour force. During the 1990s, contemporaneously with the rapid expansion of PSP in the water and sanitation sector, these trends have been expressed in high unemployment rates, a growth of unstable and informal employment with low wages and no social benefits, and worsening patterns of income distribution. The resulting social polarization and spatial segregation are expressed in differential patterns of access to WSS regarding coverage, service quality, and affordability, which represent crucial constraints for the implementation of the WSS programmes based on the promotion of PSP. The worsening conditions of socio-economic inequality, poverty, deprivation, and uncontrolled urban expansion hinder the possibility of success of PSP, as the large multinational companies that have been at the forefront of the mainstream WSS policies are not interested in serving the poorest sectors of the population.

In this connection, the limits of PSP as a vehicle for expanding WSS to the poor are increasingly recognized not just by donors and some IFIs like the World Bank, but also by the private providers themselves. One of the solutions offered has been a modification of the original models of PSP such as concession contracts by new schemes broadly termed "public-private partnerships" or "tripartite partnerships".[57] However, the actual implementation of these models, even when they have achieved some degree of success, do not have the strength needed to face such a challenge as the one posed by the MDGs. The main weakness of these models, in addition to their chronic financial shortcomings, is that citizen participation continues to be largely neglected despite being paid lip service in the official programmes and even included in the text of the contracts. Unless a qualitative change takes place in the forms of citizen involvement in the decision-making process and in the control and monitoring of WSS, the MDGs cannot be achieved.

[57] For example, in the Buenos Aires Suburban Area and in Niterói –among other cases–, cooperation programs were implemented between the company, the municipality, and the communities to expand the networks in poor areas. The municipality provides the materials for the extension works, the neighbors offer their labor, and the water companies project management and coordination.

Appendix

Table Nº 1. World population growth per areas in the last fifty years and trends

	Absolute values				Rate of growth		Relative distribution			
Area	**1950**	**1975**	**2000**	**2030**	**1950-75**	**1975-2000**	**1950**	**1975**	**2000**	**2030**
North America, Japan, Europe, Australia and New Zealand	732	941	1069	1105	1.0	0.5	29.0	23.1	17.7	13.6
Urban	405	650	805	916	1.9	0.9	**55.3**	69.1	75.3	**82.9**
Rural	327	291	264	189	-0.5	-0.4	44.7	30.9	24.7	17.1
Africa & Asia	1622	2812	4467	6283	2.2	1.9	64.3	69.0	73.8	77.4
Urban	276	696	1649	3371	3.8	3.5	**17.0**	24.8	36.9	**53.7**
Rural	1346	2116	2818	2912	1.8	1.2	83.0	75.2	63.1	46.3
Latin America & Caribbean	167	322	519	726	2.7	1.9	6.6	7.9	8.6	8.9
Urban	69	197	391	604	4.3	2.8	**41.3**	61.2	75.3	**83.2**
Rural	98	125	128	122	1.0	0.1	58.7	38.8	24.7	16.8
Africa and Asia (excluding Japan)	1789	3134	4986	7009	2.3	1.9	71.0	76.9	82.3	86.4
Urban	345	893	2040	3975	3.9	3.4	**19.3**	28.5	40.9	**56.7**
Rural	1444	2241	2946	3034	1.8	1.1	80.7	71.5	59.1	43.3
Total	2521	4075	6055	8114	1.9	1.6	100.0	100.0	100.0	100.0
Urban	750	1543	2845	4891	2.9	2.5	**29.8**	37.9	47.0	**60.3**
Rural	1771	2532	3210	3223	1.4	1.0	70.2	62.1	53.0	39.7

Source: Ledo (2002), based on data from UNPFA (www.unpfa.org).

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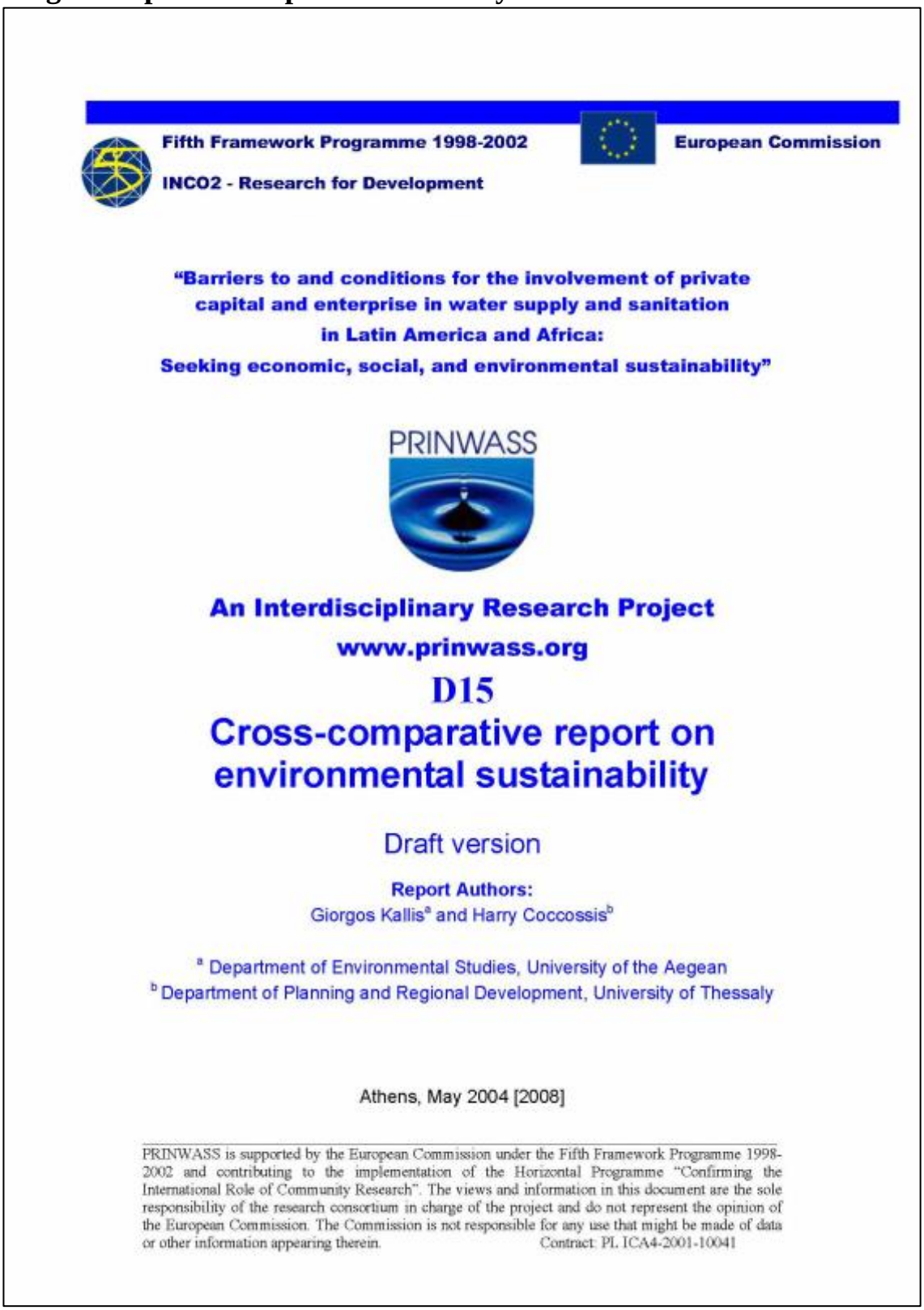

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D15

Cross-comparative report on environmental sustainability

Draft version

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ARTICLE 5

Cross-comparative report on environmental sustainability

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Introduction

Objective

The PRINWASS project is examining a number of cases of private involvement (PI) in water and sanitation services (WSS) around the world. The aim is to test the relation between the degree of private involvement and sustainability (economic, social and environmental). Proponents of PI claim that it can improve the overall performance and sustainability of a WSS system. PRINWASS aspires to test the truth value of this claim (PRINWASS Work Programme: 19).

This report focuses on one of the many dimensions upon which performance and sustainability of the system can be assessed: the environmental. The objective is to assess whether PI in WSS can be related to improvements in environmental performance, based on the empirical evidence from a sample of case-studies.

Structure of this report

Section 2 develops a methodological framework for the assessment of the environmental performance of a WSS and its relation to the organisation of the WSS (vis a vis. PI). Although the lack of empirical data in the case studies examined renders some of the discussion of section 2 irrelevant, still some of the theoretical and methodological points raised are of broader significance for the scientific assessment of the impacts of PI.

First, we discuss the different impacts an WSS can have on the natural environment. Then, we present the spectrum of different organisational forms ("regimes") that can be found in WSS services. Next, we provide some potential links between PI and environmental performance. Any accurate assessment is extremely difficult and conditioned by the local context. An identification of the main complexities

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for the desired inter-comparison paves the way for structuring a more pragmatic approach. Finally, we set down a basic framework for the comparative assessment of environmental performance in the different cases and a related information template to report on case-study information.

Section 3 compares the empirical information from the different cases and raises some key points. Given the nature of the data and the inherent limitations of such assessment, comparison is to a large extent qualitative. This is not necessarily a drawback. Indeed. this report aims not only to serve as an empirical test of whether PI leads to better environmental performance, but equally importantly to reveal the high (nearly insurmountable) complexity and uncertainty in such an assessment.

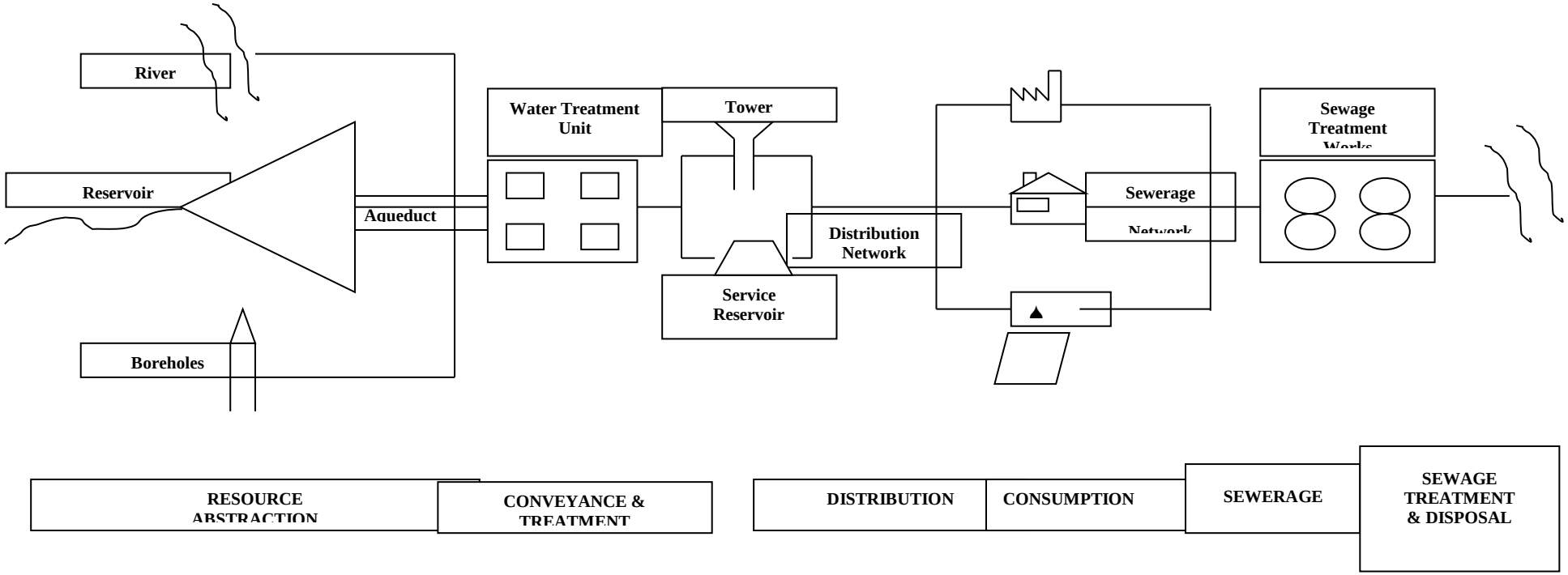
In section 4, we attempt to draw some basic conclusions from the qualitative inter-comparison of the case-studies and address the primer questions of this research. The Annex presents detailed information for each case.

Theoretical and methodological framework

Water Supply and Sanitation (WSS) systems and the environment

Figure Nº 1 gives a schematic representation of a water supply and sanitation (WSS) system.

Figure Nº 1. The WSS system



Source: Marsalek et. al., 2001.

In providing its services (drinking water provision and sewerage disposal) to the users the system:

- modifies environments and landscapes,
- utilises natural resources, and
- produces by-products and end-wastes.

All these affect the the natural environment. The WSS takes a natural resource from the environment (freshwater), treats and distributes it for use, collects and treats the used wastewaters and returns them and the by-products (sludge) of treatment back to the environment. Moreover, the system transforms the environment in order to secure water (dams, transfers, etc), uses land for its building and networks, equipment and services for carrying out its operations and energy and other materials for its treatment processes and distribution systems. On the other hand, the system has also positive impacts by contributing to the creation of new environments (e.g. irrigated urban areas) and in controlling the pollution of recipient waters.

The main environmental impacts of the WSS relate to the following:

1. Abstraction of freshwater
   - Subsidence of water-table / salinisation of aquifer;
   - Subtraction of water from aquatic ecosystems;
   - Desiccation of land;
   - mpacts from the construction and operation of storage waterworks (dams)

2. Disposal of waste
   - Impacts from sewage pollution on recipient waters and aquatic ecoystems;
   - Impacts from solid waste (sludge from treatment processes) on recipient environments;

3. Process
   - Energy consumption in operation – greenhouse gases emission;
   - Materials' consumption and land occupancy.

Environmental performance can improve by:

- policies and measures that improve water use efficiency and thus control abstractions;
- policies and measures that treat and reduce pollutants' emission;
- policies and measures that reduce the use of energy and materials in operations.

<u>WSS organisational regimes</u>

WSS include several core and non-core services (Hukka and Katko, 2004). PI may take place in any of these services. "Privatisation" refers generally to the transfer of

responsibilities in the management of core urban water services from public to private entities. Figure 2 provides a classification of WSS organisational regimes on the basis of two criteria: ownership and management of assets.

In this report we explore causal links between more PI in the utilities responsible for WSS in the urban area (i.e. "shifts" up and to the right in figure 1) and changes in environmental performance. This is a pragmatic analytical choice, with all its drawbacks. It is more limited than the full PRINWASS research scope because:

1. Ownership and management of the core utility does not capture the whole WSS organisational structure in the urban area. For example,

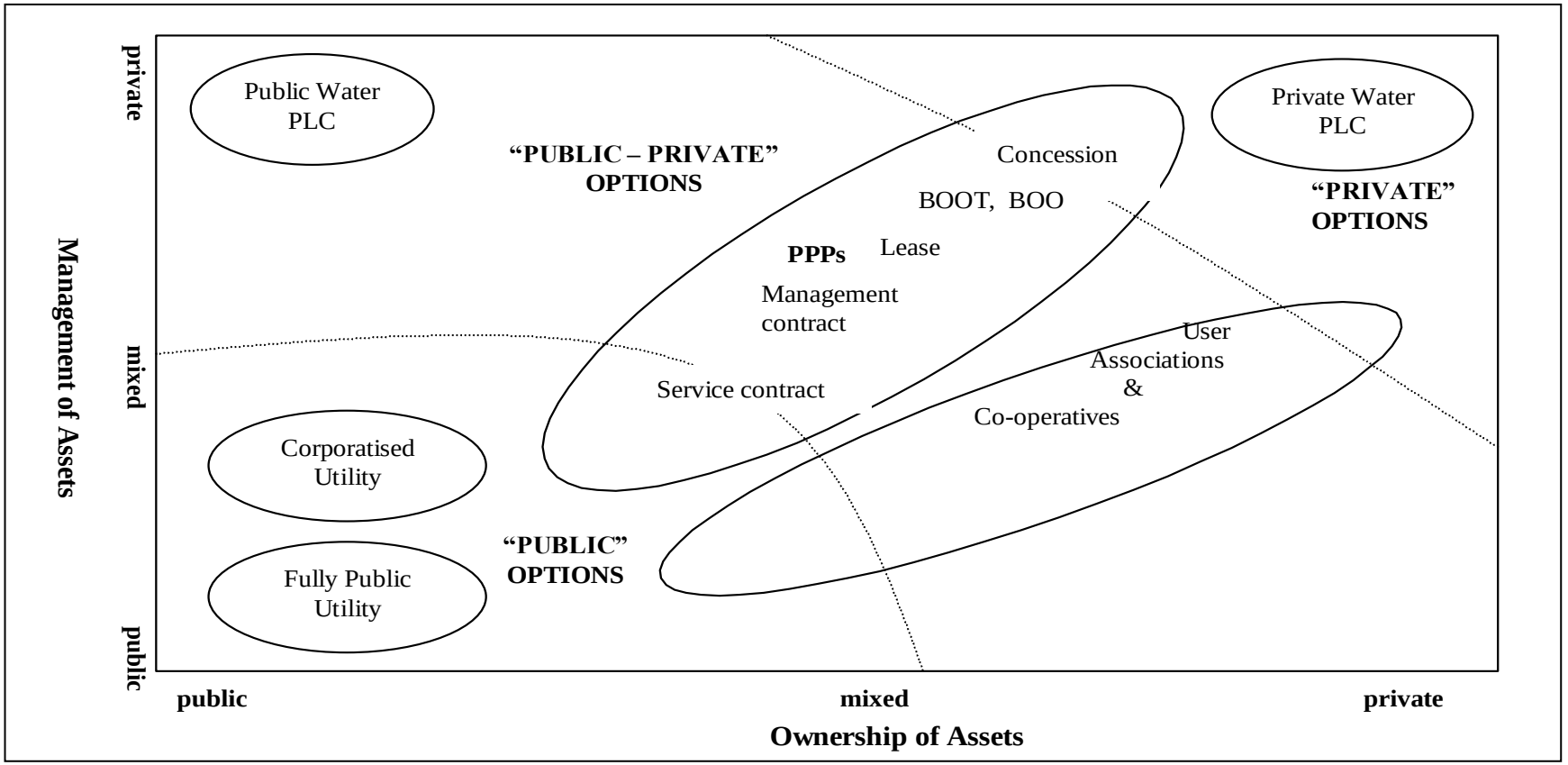
- There might be important changes in PI in non-core services (e.g. increase of sub-contracting).
- Different WSS systems and forms of organisation may co-exist in one urban area (such as "informal" water networks, especially important in a Latin American and African cities).

2. Environmental issues in many cases cannot be "boxed" at the urban utility level, since they have a broader regional dimension.

3. Changes in the regulatory structure and content might be more decisive than changes in ownership and management.

It is important to keep these qualifications in perspective and bring them into the analysis and comparison.

Figure Nº 2. A Taxonomy of Public-Private Organisational regimes



Source: Modified from Blockland et. Al., 1999.

Note to Figure Nº 2:

Fully **public utilities** include the archetypal types of: government water service departments; "regies" (internal municipal government entities but with a defined and separate set of accounts); more independent publicly owned, public law utilities (typically municipal and rarely provincial or state-based).
Corporatised utilities refer to public law companies that resemble private companies in terms of managerial independence and flexibility.
In Private limited companies such as those in England and Wales, water services are provided by fully private utilities with ownership of infrastructure assets and full responsibilities for all operations, maintenance, revenue raising and investment.
Public Private Partnerships (PPPs) refer to organisation models where ownership of the system (or part of it) remains in public hands and its operation (or part of it) is delegated to private entities. In a **concession**, the government lets a long-term contract, usually over 25 years, to a private company, which is responsible for capital investment, operations and maintenance. A **lease** is a long-term contract (usually 10-20 years but can be longer) where the private sector is responsible for operations and maintenance and sometimes for asset renewals. Assets remain in public sector and major capital investment is a public responsibly. **BOT** (build - operate - transfer) and **BOO** (build, operate and own) contracts are issued for the construction of specific items of infrastructure, such as a bulk supply reservoir or treatment plant. The private sector is responsible for all capital investment and owns the assets until transferred to the public sector. In BOO schemes, private ownership is retained. **Management contracts** are short-term (typically five years) where private firms are only responsible for operations and maintenance. **Service contracts** are single function contracts to perform a specific non-core service for a fee, e.g. install meters (Rees, 1998).
Public limited companies (PLCs) (state or municipal) have a corporate structure with a managing director and a board of directors. Unlike the corporatised utilities, they are commercial business operating under private (company) law. Unlike a private company however, their shares are owned by government (local, provincial or national). Minority private shareholding is possible (Hukka and Katko, 2004).
Co-operatives are enterprises (public or private law) owned and controlled by the users of the goods and services provided. Users can be consumers, employees (e.g. trade unions) or producers of products and services. In most co-operatives, users are actively involved in aspects of management and decision-making.
Several combinations of the above generic models may be found. For example, a PLC or a corporatised utility may operate under a concession or management contract with the government. The term "**Public-Public Partnership**" (Hall, 2001) has been used for such schemes where autonomous public utilities are delegated services under contracts, the government retaining ownership or responsibility for financing of assets.

Linking the WSS regime and PI with environmental performance

Efficiency and environmental performance

The main argument of proponents of PI in WSS argue is that it will lead to a better, that is a more "efficient", operation of the system. Improvement in operational/management efficiency may, but does not necessarily lead to improvement in environmental performance. In theory, improved efficiency in operations should lead to a more cost-effective achievement of environmental objectives, or (in reverse), better environmental results for a given amount of financial resources. In practice though:

1. Environmental goals may be traded off with economic benefits under the pretext of improvements in "economic efficiency".

Reducing expenditures and increasing "sales" for example may lead to increases in indicators of the "economic efficiency" of the utility but this may be achieved on the burden of water use efficiency (e.g. if leakage control expenditures are cut or demand left to grow unconstrained). This owes to the oft narrow conception of "economic efficiency" focussing only on the private costs for the company and not taking into account the external and long-term costs of water use.

2. Environmental objectives are not always fixed.

Environmental objectives are typically expressed in regulation. Regulation however is not fixed. It often changes as a result of PI. New standards may be set to the operator under a private contract or existing standards may be "watered down" to make a contract attractive to private investors.

Financing and environmental performance

In many cases, the debate about privatising urban WSS services is strongly influenced by the requirement for environmental investments, such as for the construction of sewage treatment plants. A basic question is therefore: has PI been followed by more money channelled to environmental protection-oriented measures? This would be an important criterion in cases where financing of environmental measures figured prominently in the pro-PI debate.

A simple look into the figures however, may lead to a misleading impression. It is important to look into the sources of the funds and whether the financing of the measures can be linked to PI or not (for example, it might be a case of continued state subsidisation, external donations, etc). In principle, private companies and public sector water undertakings can raise funds from the same range of sources as used by private companies. The one form of finance not available for public sector undertakings is equity finance from private shareholders. In some cases this might be an attractive option; in others, it might be more expensive than debt borrowing. In practice, the ability of the utility to borrow from banks will depend on its management (e.g. preparation of an investment plan) and credibility. PI might improve the standing of the utility and hence

reduce the "cost of money". It remains to be tested empirically whether this happens or not.

Innovation and environmental performance

A main claim in favour of PI is that it leads to technological and organisational modernisation of the operator. Bureaucracy and the lack of competitive incentives in public undertakings is assumed to create inertia in the adoption of new technologies or in changing to new forms of management and organisation. Many environmental resourceful technologies, e.g. renewable energy sources, water demand management, environmental management of production processes, face systematic barriers in their adoption by water operators, not least because of fixed attitudes. The question thus is: can PI be linked to an enhanced adoption of environmental management measures and a more positive attitude towards the environment?

An approach to comparative research

Context and inter-comparison

Ideally, a testing of the starting hypothesis (does PI lead to improvements in environmental performance?) would be based on an inter-comparison between different cases with varying degrees of PI and a comparison of their environmental performance. This however would necessitate an isolation of the two relating variables (PI and environmental performance) from the broader context: social, economic, cultural, historical, environmental, regulatory, etc (in addition to isolation and weighing of environmental performance vs. other service performance). A water operator in Scandinavia for example, is much more likely to have a better environmental record than one in Latin America for a multitude of reasons among which the degree of PI is probably one of the least important.

An alternative strategy, and the one adopted in this report, is to assess each case on its own merits. For each case we ask: has PI lead to an improvement of environmental performance?

The implicit (strong) assumption in this approach is that the "context" is constant and PI is the only variable affecting operator and subsequently environmental performance (more on this, below). If a sufficient number of cases suggest a relation between PI and environmental improvements, then this would point to a potential confirmation of the hypothesis (and vice versa if not).

There are some key limitations with the chosen approach.

1. The sample of PRINWASS case-studies examined does not allow for a definite generalisation.

2. It is an oversimplification to refer to PI in general. There are very different forms of PI and different ways of applying them, specific to local conditions.

3. The case-by-case approach does not allow for a connection of environmental performance to specific attributes of the organisational regime.

Understanding and characterising context remains important, as environmental improvements might be much more important, difficult or demanding in certain cases than in others. Also, urban areas in different natural settings and with different socio-economic trajectories may face very different environmental issues. For example, for a WSS system in a dry region, with limited available water supplies, leakage and delivery efficiency is important. In comparison, for a WSS system in a wet region with access to an abundant yet polluted river, leakage may not be as important as upstream pollution control and water treatment. Comparison needs to keep these relative priorities in perspective and judge each case on its own merits.

Similarly, the priority of environmental vs. other WSS issues may vary according to case. In developing world cases, access of the poor to drinking water and universal provision of sewerage services are more pressing than in advanced countries which have tackled such problems.

On the other hand, this is no justification for a continuous environmental deterioration following PI, much more as environmental problems are often linked to poverty issues. The emphasis on changes (and improvements) rather than environmental performance per se, partly overcomes such differences in comparison. Still some recognition of the context is necessary, as for example investments in environmental improvements may reasonably receive lesser priority than e.g., connection to the network.

Towards this end, it is important to have comparative information on the different basins and WSS systems, the different urban socio-economic systems and the relative priorities of environmental issues and environmental vs. other issues in each of the cases.

The environmental context

WSS services entail certain impacts to the environment. The impacts on the state of the environment may vary according to local circumstances. Moreover, WSS-related activities may not be the only ones impacting on the environment. For example, a reduction of the water table or a diminution of river flows may be the combined effect of agricultural and urban water abstractions. The degradation of a riverine ecosystem may be the complex outcome of many catchment activities and modifications (land-uses, agricultural and urban run-off, climatic patterns, etc). WSS-related pressures (abstractions, sewerage disposal) therefore are only components of the overall pressures to the natural environment.

Although for a proper comparison an assessment of the environmental impacts would be necessary (e.g. in terms of impacts on ecological status, habitats, etc), this is a very difficult task given variations in local conditions. It is beyond the scope of PRINWASS research. Instead, emphasis will be on the performance of the operators per se with respect to activities that entail some environmental impact, much alike the spirit

of the EMAS (Eco-Management and Audit Scheme), which focuses primarily on company processes and their environmental management (and not their end-impact).

Weighing

Improvement of environmental performance in one dimension may lead to a decrease in another. For example, resort to desalination technologies to alleviate pressure from water abstraction to aquatic ecosystems, may create new problems in terms of energy consumption and contribution to climate change. Another example: the more wastewater quality is improved, the more energy that is needed for the treatment process, and the more sludge produced and transport required.

Ideally, a comprehensive assessment of environmental performance would need some form of a complete Life Cycle Assessment (LCA) in two different moments in time (e.g. before and well after PI). LCA has been applied to the assessment of drinking water supply options (review in Lundin, 1999). KIWA, a research and consulting firm has developed a prototype LCA according to the eco-indicator method for the Dutch drinking water industry (VEWIN, 2000).

Nonetheless, the state-of-the-art is still far from allowing an easy, "cook-book approach" in the application of LCA on WSS systems. There are many scientific and methodological issues still unresolved. A most crucial and generic difficulty however concerns the aggregation and relative weighing of different environmental factors. There can be no perfect, "objective" way of doing this and certainly there is no universal rule applying to all conditions. Soil desiccation from groundwater over-extraction might be very important in the Netherlands, but much less in Greece. Low flows from dam construction and river abstractions may be important in Greece, but irrelevant in the Netherlands. Different LCAs are therefore necessary for different settings. Furthermore, there is no neutral, objective way of judging on the relative importance of impacts. How can one for example objectively weigh the importance of impacts from desiccation vs. the importance of impacts from increased energy consumption to climate change? This not only requires knowledge of such uncertain factors as the future ecological impacts of climate change, but also value judgements on the relative importance of impacts for different ecosystems and people in different spatial and temporal scales.

An LCA of the different WSS case-studies conducted in PRINWASS is beyond the scope and resources of this project. Nonetheless, it is our contention that a meaningful qualitative (and where possible quantitative) analysis is still valuable. By asking case-study researchers to evaluate whether the environmental performance of the WSS has improved in certain dimensions and putting them to support their arguments with qualitative information and quantitative data where available, we aim to provide a rich picture of developments in environmental performance and their relation to PI. Still, conclusions will be far from simple and definite and discussion should be sensitive to differences in context.

Environmental performance vs. efficiency

It might well be argued that an assessment of environmental performance and impacts alone is misleading, even meaningless. Environmental improvements with an excessive social or economic cost are not necessarily desirable. It can be argued that is not fair to assess negatively, for example, an operator where environmental performance may have deteriorated, if improving this performance entailed an excessive cost (much more in a context where many people would not be able to cope with the rising cost). Similarly: should an improvement in an environmental dimension (e.g. reduction of water consumption and abstraction from sources) be judged positively if it has been achieved on the burden of e.g. social sustainability (e.g. a case where rising prices lead to increased levels of disconnection or decreased consumption from poorer households).

On the other hand, nor is an "efficiency" criterion focussing on discounted monetary costs a more adequate indicator. This masks non-monetarisable environmental and social costs, especially those "externalised" by the operator and those passed to the future.

The best approach is one in which different disaggregated data and indicators form part of an overall evaluation matrix upon which a politicised debate can take place (Martinez-Allier et al, 1998). In this report we focus exclusively on the environmental dimension and data, bearing in mind that this is only one among the many dimensions in order to assess the overall "sustainability" of the system. We assume that a richer picture and multi-faceted evaluation can only be the result of combining this study with those in the other horizontal PRINWASS reports.

Broader trends

A final issue in the comparative assessment concerns the limits in attributing improvements in the environmental performance of WSS to the operator and in relation, PI. This relates to the assumption of a constant context in time, which is far from realistic.

1. It might be the case that broader socio-economic, cultural, political (etc.) changes have much more to bear. For example, a recession may lead to a reduction in water consumption and thus pressure on freshwater ecosystems. This should be clearly distinguished from a demand management initiative of the operator with positive results in controlling consumption. One way through this is to focus on actions and initiatives (e.g. implementation of a demand management programme) as rough indicators of changes in environmental performance, rather than on (or in addition) to quantitative data and indicators

2. Changes may owe much more to regulation and government's policy initiatives than to the behaviour of the operator. It is a delicate issue whether these should be attributed to the operator and PI or not. Equally difficult is to judge what would (or could) have happened otherwise (would the same

regulation be implemented without PI? Would the public operator implement it better or worst?).

3. Changes often do not take place in specific moments but in a continuous spectrum of time. For example, certain programmes may have been initiated by public authorities before PI, but concluded and yield results only after. Reversely, negative trends may have also started before PI, with the privatised company inheriting a very negative situation.

All the above render extremely difficult a quantitative assessment of environmental performance. In the assessment framework presented next, a flexible approach is developed allowing both for quantitative data and qualitative information and facilitating the case-study analyst to explain the broader context and changes in this.

Assessment framework

Assessment of environmental performance in the different case-studies is performed via means of the structured template (presented in Annex I). This template consists of a list of questions and data requirements. Although analysts are asked to rank and provide score assessments to specific appraising questions, the template should not be seen as a questionnaire with the aim of quantification. Instead, the aim is to yield information from the case-studies in a systematic and comparative fashion. The expression of appraisal in specific scores (where required) seeks to provide "discipline" and systemisation in the responses, in comparison to the existing case-study reports, where information and arguments on environmental performance are diffused in the text. Assessment still relies heavily on the judgement of the analyst, and thus his/her own bias, perceptions, values and opinion. There is no claim to supreme neutrality or objectivity, other than the degree to which the data and argumentation provided to support responses, is or is not convincing.

The template is divided in three parts. In Part A, contextual information about the characteristics of the case is provided, in order to reveal the peculiarities (and priorities) of each case and its differences with the others. In Part B, the goal is to assess improvements in the adoption of certain environmental measures. In Part C, the goal is a more generic, overall assessment of the effects of PI on environmental performance (in comparison to Part B, where the focus is on specific measures / performance dimensions).

The contextual information in Part A asks for background data on the city/region of the examined case and for some technical characteristics of the WSS (Sheet A1). These are complemented by information on the environmental characteristics of the system (Sheet A2). These relate to the freshwater resource system and the river basin the WSS utilises for the production of drinking water as well as the recipient water systems to which sewerage (treated or untreated) is disposed.

- Sheet A3 aims to yield a characterisation of the organisation of the WSS and the degree and type of private involvement.
- Sheets A4-A6 aim to weigh the relative importance of different environmental issues, both between them and with respect to other WSS problematic areas. Comparison is based both on the opinion of the analyst on the relative weight of the different problems, as well as his/her appraisal on the relative weighing of the different issues in the actual political debate.

Assessment of environmental performance (Part B) focuses on the following measures:

- water-efficiency (demand management and losses control),
- energy efficiency (energy conservation, energy recovery from system and use of renewable sources) and,
- improvements in wastewater treatment and sludge disposal.

In addition, Sheet B5 assesses structural changes within the operator that aim to improve overall environmental performance (self-assessment, planning, reporting).

In each dimension, the same structure of assessment is followed. First, the analyst is asked to give his/her own overall appraisal on the question of improvement, hinting to the most relevant information that supports his/her response. Then, indicative data / indicators are provided that can elucidate trends. Subsequently, overall assessment is broken down into the assessment of specific related actions / measures (implemented or not, or if implemented in the past, which is unlikely, whether their implementation has improved in the period under examination). As some analysts may not be aware of the technicalities of the measures, relevant information is given in footnotes.

The questions in Part C aim to a horizontal appraisal of the overall environmental performance of the operator. As discussed above, looking only on specific measures is limited as the context may not be constant. Furthermore, improvements in specific measures post-PI relative to a period of public control may not be tractable, although in relative terms (i.e. in doing the same things) there might be an improvement (or deterioration) in effectiveness. Sheet C1 asks for such a judgement on overall effectiveness in environmental performance. Sheet C2 focuses on the financing of environmental measures; whether this has increased, and more specifically in the case of PI, whether the contribution of the private sector in such financing has increased. Finally, sheet C3 asks for a general appraisal of improvements in innovation and adoption of new environmental protection-related technologies / approaches. These questions are less specific than those of Part B, and thus rest more on the opinion of the analyst. In this respect, it is crucial that more information and argumentation is provided in support of responses. As the objective is a generic / horizontal assessment, some of the information provided in Part B may be also relevant in Part C.

Empirical results and discussion

Detailed data for each case study is available in the annexes. Here, some important comparative findings are raised.

The case-study sample: types of Private involvement

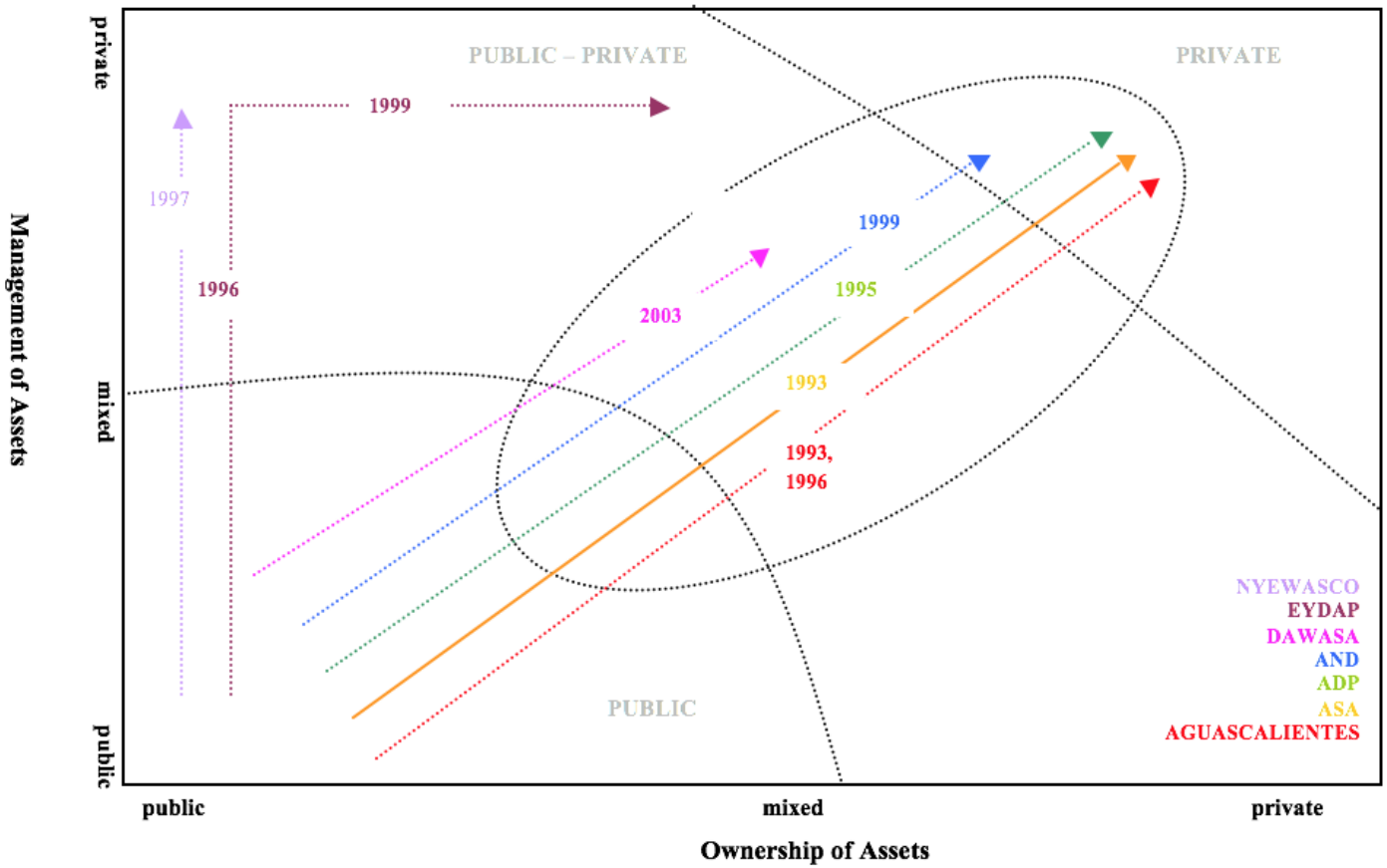
Seven WSS utilities from 6 countries are examined. The sample includes one (southern) European case, four from Latin America and two from Africa:

1. Aguascalientes (Aguascalientes, Mexico)
2. EYDAP (Athens, Greece)
3. AASA (Buenos Aires, Argentina)
4. DAWASA (Dar es Salaam, Tanzania)
5. ADP -Aguas de Limeira (Limeira, Brazil)
6. ADN - Aguas de Niteroi (Niteroi, Brazil)
7. NYEWASCO (Nyeri, Kenya)

Figure Nº 3 positions the utilities and recent changes according to the degree of PI (dates refer to year of change).[1] Aguascalientes, AASA and ADP are private operators with 30 year concessions from municipal governments. ADN operates a 25-year concession. DAWASA is a private undertaking with a 10-year lease. EYDAP is a mixed public-private (majority public) company with a 20-year lease. NYEWASCO is a municipal plc.

[1] Difference of lines in Figure Nº 3 is for the sake of distinction; does not reflect any differences in organizational form.

Figure Nº 3. Recent changes in the degree of PI in the case studies



The context

The urban context

Of the seven cities, only Athens and Buenos Aires are capitals of their countries. These two and Dar es Salaam are the only "metropolitan" (more than 1 million people) systems in the sample (around 4 million in Athens, 9 million in the area served by AASA in Buenos Aires and 2.5 millios in Dar es Salaam). The other four systems are of a medium to large size, ranging from the 120,000 people for Nyeri to the 650,000 of Aguascalientes.

None of the cities is experiencing any considerable population growth. In comparative terms, Dar es Salaam, Nieri, Aguas Calientes and Limeira are the ones from the sample with higher than 1% annual population growth (4.3%, 3.7%, 2.8% and 2.09%, respectively). Buenos Aires and Athens are experiencing considerable growth in the outer municipalities of the metropolitan areas, but population in the central urban areas is stable or decreasing.

The two African cities and Limeira in Brazil stand out as considerably poorer relatively to the other four, which have similar levels of GDP. Characteristically, Dar es Salaam and Nieri have unemployment rates in the order of 45%. In the more developed cities, unemployment ranges from 1.2% for Aguascalientes to around 16% for Buenos Aires.

The water resource context and environmental problems

Data from the case studies and the questionnaires allows a general assessment about whether the cities are facing notable problems or not, in relation to water abstractions and sewerage discharges. It does not permit however a more in-depth identification of specific WSS-related environmental problems faced in each city. Such secondary environmentally data was not available in the examined cities; collecting and analysing primary information on environmental impacts was beyond the scope of the PRINWASS project. Therefore, lack of reference by the analysts to some environmental impacts should not be taken as evidence that they are not important.

From the 7 cases, the one facing the most important water-stress related problems is Aguascalientes. This is also the only city which utilitises 100% groundwater for drinking water. In Athens, Buenos Aires and Dar es Salaam groundwater sources are used by individual users in the urban area and only as a supplement for the central system (0-10%, 4% and 14% of total water used, respectively). Nieri and the two Brazilian cities use 100% water from rivers.

Overexploitation of groundwater reserves and depreciation of the water table is a considerable issue in Aguascalientes. This is however mainly due to the use of the aquifer for agricultural purposes. A water rivalry between the city and rural uses takes place over the limited groundwater reserves.

In comparison, in Buenos Aires, the opposite problem is faced. Abandonment of the use of the aquifer in favour of the more abundant river supplies have led to an elevation of the water table causing damage to building settlements. Buenos Aires is the only city of the 7 in which such problems are faced.

The abundance of the Rio de la Plata makes Buenos Aires the only city of the seven with an unproblematic supply in terms of the available quantity of water. All other six face to a lesser or greater extent rivalries with other river basin users over water supplies. Limeira and Niteroi for example use water from carriers and rivers shared with other cities. In Athens, although the city has an extended system that brings water from a far-distant river, there are limited rivalries as there are only a few small other users in the river.

In Athens, water stress problems have been solved with the construction of two dams (in 1980 and 1997), which have caused significant environmental impacts in their valleys and in downstream aquatic ecosystems. Impacts included deterioration of landscape, reduction of flows and desiccation of estuaries. Presumably environmental impacts from freshwater abstractions should also be considerable in the other water stressed cities of the sample (analysts intuitively assign them as important), but there is no detailed data to back such claims.

Those cities that use river sources are also particularly susceptible to problems from the pollution of their sources from upstream activities. Such concerns are voiced in all cities. The gravest concerns appear in Buenos Aires, which utilises the polluted waters of Rio de la Plata and the two Brazilian cities whose drainage basins host considerable agricultural, industrial activities and urbanisation. The two African cities also use polluted river waters. Athens is the one with the fewest problems. Its main reservoir is well into the mountainous hinterland, free from pollution pressure. Nonetheless, the second reservoir of the city, used for supplementary supply when demand is high, is polluted from upstream agricultural and industrial activities.

Generally, there is a lack of data such as to allow an appreciation of the intensity of water quality problems in each city and their assignment to specific upstream polluting activities. Pollution from the cities is causing considerable impacts to downstream or coastal uses. In Dar es Salaam and Nyeri, untreated sewerage discharges are a source of diseases in settlements close to the discharge areas. In Athens, Buenos Aires and Niteroi, sewerage management is an important issue as it affects leisure (tourism, recreation) and to a lesser extent, fishing activities in the coastal waters. Aguascalientes is the only case reported as not having considerable wastewater problems, due to a very adequate treatment and management system.

Priorities about the environmental management of WSS relate to the above issues. In water-stressed areas (e.g. Aguascalientes), water efficiency and demand management are important priorities. Pollution control is more important in the cities that did not have adequate secondary treatment or in which damage to sensitive downstream uses and ecosystems takes place. Leakage control is recognised as an important task in all cities, because of the considerable quantities of water lost in transfer and distribution.

Table Nº 1 summarises the importance assigned to selected environmental problems and measures by the case-study analysts. It worth noting that water demand management appears an important measure in all cities, even in those that do not face water stress (such as Buenos Aires).

Table Nº 1. Relative importance of selected environmental problems and measures in the case cities

	Aguascalientes	EYDAP	AASA	DAWASA	ADP	ADN	NYEWASCO
Overabstraction of freshwater	+++++	+++	+	++++	++	+	+++++
Impacts from waterworks	++++	+++	+	++	+	+	+
Downstream impacts from sewerage discharge	+	+++++	+++	+++++	+++++	++++	++++
Water demand management	+++++	+++++	+++++	+++++	++++	+++	+++++
Losses control	+++++	++++	+++	+++++	+++	++++	+++++
Sewerage treatment	+++	+++++	+++++	+++++	+++++	+++++	+++++

\+ not important +++++ very important

Source: responses to questionnaire.

The service context

The degree of service coverage relates to the economic development of the cities. Aguascalientes, EYDAP and ADP are the only ones with full drinking water and sewerage service coverage. On the other extreme are the two African cities where service is very limited (33% of the population served with a central supply of drinking water in Dar es Salaam and 38% in Nyeri; 10% and 13.5% of the population of the two cities respectively, has access to a sewerage network). ADN in Niteroi provides drinking water supply to all population; 25% of the population, however, does not have access to the sewerage network. Service coverage is an important issue in Buenos Aires. 20-25% of the population remains unconnected from the central drinking water network and 40-45% does not receive central sewerage services.

As expected, in those cities that full service provision is not yet guaranteed for all, connection of the remaining population to the network receives much more priority than environmental protection issues. In Buenos Aires, Dar es Salaam, and Nyeri the extension of the network to underserved areas was a central issue in the debate for PI and figured in the contracts with the private operators.

Environment-related issues were not very important in the PI debate. Exceptions are the two Brazilian cities where financing, construction and operation of sewerage treatment plants was a principal reason for the concession contracts. Reduction of water losses was also earmarked as a task for the operators in the contracts of Aguascalientes, EYDAP, Nyeri, ADN and ADP.

In all cases, improvements in the management and the operational efficiency of the utilities were the key reasons for PI. An implicit assumption was that environmental management will benefit too by the more efficient utility administration and operation.

Assessment of environmental performance

Water efficiency: demand management and losses control

The lack of disaggregated, historical data on water consumption prior and well after PI does not allow a conclusive assessment on the impacts of PI on water demand management.

Indicators on water losses too are given as percentage of "Un-accounted for water" (UFW). This is an indicator of limited value, because:

1. In addition to physical losses, UFW includes also illegal or unmetered water uses, under-registration by faulty meters, etc.

2. Percentage of losses depends on total water use (i.e. an increase in water consumption will lead to a reduction in the percentage of water lost, although the absolute value of losses might have not decreased).

Instead, discussion has to rely on the indications of the appraisal by the case-study analysts on the uptake or not of water efficiency measures after PI. Table Nº 2 provides the results of this assessment.

Table Nº 2. Degree of improvements in the uptake of water efficiency measures after PI in the case cities

	Aguas calientes	**EYDAP**	**AASA**	**DAWASA**	**ADP**	**ADN**	**NYEWASCO**
Demand management	++	+	+	n.a.	+++	++++	n.a.
Water losses' control	++	++	++++	++	++++	++++ +	+++++

+ no improvement +++++ considerable improvement

Source: responses to questionnaire.

However, the appraisal of the analysis may:

1. be limited due to limited access to information.
2. be partly subjective and not be directly comparable between cities. Indeed, analysts in different cities seem to appraise differently similar efforts in water efficiency.

The most pragmatic approach to an appraisal is a more qualitative presentation of actual initiatives in the cities. This follows below.

In Aguascalientes, important water efficiency initiatives seem to be at place after PI. Measures implemented include an increase in the number of users metered and an implementation of volumetric instead of fixed prices, differentiated also according to neighbourhood of the city and level of water use (hence targeting with special tariffs high-level consumers). A large scale information and awareness campaign for water-saving was also run with broadcasts, public events, school education, etc. Wastewater also is recycled to secondary uses. Modern leakage control programmes have been implemented, including camera based and electoracoustic lekage detection and GIS digitilisation of the network.

On the other hand,

1. It is not definitely clear to which extent these should be attributed to PI (this may partly explain the low score assigned by the case-study analysts; Table 2).
2. The effectiveness and intensity with which these measures are implemented is unknown. Indeed, the physical losses reported remain excessively high (50%).

In Athens, there is data which allows some preliminary assessments. Per capita water use has increased considerably after PI. This is not justified by demographic or economic trends in the city. However, it is partly explicable by the fact that water consumption had decreased considerably between 1990-1993 due to a drought and an intensive water-saving campaign. Still, the quick recap of water consumption and the increase to historical highs indicates also the lack of a committed demand management policy on the part of EYDAP. Water prices have increased only slightly and without taking into account in their design water-saving objectives.

The main water-saving initiative that has taken place concerns the management of sources, where the implementation of a decision-support system aims to optimise the use of the different reservoirs and hence reduce related seepage or overflow losses.

EYDAP has implemented some minor losses' control activities (zoning, experimental detection and control, etc) with limited impact. It is perhaps too early to judge on the impacts of PI on network efficiency, as replacement and rehabilitation of pipes and leakage detection and control are an important element of the 8-year (2000-2008) investment programme of EYDAP. Implementation of the programme has met difficulties after its second year. It has not been possible to obtain company data that would allow an assessment of progress with respect to annual investment targets in network works. A well-ground hypothesis however, confirmed in some interviews with managers, is that network investments have stopped due to lack of state co-financing.

In AASA, the case-study analysts note an "absence" of demand management initiatives. Like Athens, the readjustment of the structure of tariffs does not appear to have taken into account water-saving objectives. Overall, water use increases and this is partly due to the connection of new customers to the network. This makes sense however given the context of the city, where a key goal is to provide access to non-serviced population and there is also a quantitative abundance of water from the Rio de la Plata.

In terms of losses' control, considerable initiatives seem to have been implemented by the private operator (though information is strictly based on an AASA's own brochure). UFW has fallen from 44% in 1993 to 32% in 2003 (but see comments on unaccounted for water above) and it is estimated that 1 Hm3 of water is saved annually from improvements in delivery efficiency. These improvements are mainly due to the installation of 6000 km of new pipes and the rehabilitation of 2000 km more. Zoning and video detection have also been used to identified priority areas and reduce leakage.

In the two African cities, there is little room for water demand management, given that the majority of the population does not even have basic access to the network and that even those who receive often have an intermittent supply. In Dar es Salaam, consumption ranges from 30-50 lt/cap/day (low to high consumption), indicating that there is very little scope for reducing demand.

In the context of the African cities, reducing losses, illegal, and unmetered uses are high priorities. In Dar es Salaam, the private concession is too recent to allow an appraisal of its impacts. There are plans by the private operator for the installation of meters and introduction of volumetric tariffs, prohibition of use of network water for gardening and irrigation, a survey of groundwater sources and a control of rival water uses. There are also plans for a network replacement and repair programme (which however will be shared by the private operator and the asset authority).

In Nyeri, UFW is reported to decrease from 49% in 1997 to 38% in 2002. This is due to the checking and replacing of faulty meters, the repair of leakages and the installation of pressure reducing valves. Still, financial constraints do not allow the leak detection and repair group of the utility to move beyond repair of surfaced losses to more proactive underground leakage detection.

In the two Brazilian cases, PI has lead to a considerable reduction of UFW (from 40 to 23% for ADN and from 40 to 17% for ADP). This is primarily due to a curb on illegal uses and the installation of new - and repair of old, faulty - meters. It is not clear the extent to which

real, physical losses have been reduced. Indeed, in the ADN system, physical losses probably have not been reduced.

As a general comment, it looks like that in most cases, PI has led to:

1. Reduction of UFW, but probably mainly due to better metering practices.
2. Increase in the proportion of volumetric-priced users and increase in water prices, without however explicit water saving goals in tariff design.

Both measures are important in terms of revenue increases for the utilities. However, they might, but they do not necessarily lead to water efficiency improvements. The effect of prices depends much on their design. Simply metering and increasing gross prices may have limited effectiveness in curbing demand (especially if water use is near its life-line minimum) while also causing undesirable social impacts.

A main reason why PI might work counterproductively for water use efficiency is that the profit motive might provide a structural disincentive against control of water demand. However this needs not be so. Proper regulatory and costing systems can make private utilities face the cost of growing water use or decouple profits from water sales. In the case studies examined, however, there are no indications of such careful designs of costing and tariff systems.

In all seven cases, total water use continues to increase considerably after PI, much more than what population change alone would suggest. The lack of data does not permit to base any conclusions on this. In the two African cases and Buenos Aires this could be due to the increase of customers connected to the network. Still, the lack of committed demand controlling measures (other than metering) is evident. In none of the cities are there specific water demand management measures implemented (e.g. retrofits/rebates, conservation tariffs, efficient landscaping, water audits, use of secondary sources), or even considered. Planning is still based on demand forecasts and supply works. There is not any integrated resource planning processes (i.e. considering demand and supply alternatives on an equal footing).

The case-studies allow limited insights on whether the new regulatory regimes following PI have been conducive or counterproductive for water efficiency. In the case of Athens, there is a mixed verdict, leaning however more towards a negative indictment. The contract has set some efficiency obligations to EYDAP, but these are loosely monitored. For example, EYDAP has not complied with leakage reduction targets nor has it reported on leakage in its network as it was demanded by the Contract with the State.

Furthermore, the institutional rearrangement of the sector insulated more the company from the rising cost of water production and its externalities, while privatisation intensified the profit motive and the goal of increasing water sales. Both have acted against a committed policy of water demand management (see Athens' case study for more details).

In the other cases, the explicit establishment in the contracts of metering and losses' reduction targets may be seen as a positive consequence of PI. It is not possible to judge by the case-studies however, the extent to which these commitments have been properly implemented.

Wastewater pollution control

Table Nº 3 summarises the responses by case study analysts on the degree of progress in wastewater treatment.

Table Nº 3. Degree of improvements in wastewater treatment after PI in the case cities

	Aguas calientes	**EYDAP**	**AASA**	**DAWASA**	**ADP**	**ADN**	**NYEWASCO**
Wastewater treatement	++++	+++	++	n.a.	+++ +	++++	++++

+ no improvement +++++ considerable improvement

Source: responses to questionnaire.

Aguascalientes has the most impressive system for wastewater treatment from the seven cases. 100% of wastewater receives secondary treatment and a considerable portion of the treated water is reclaimed for use in agriculture, irrigation and gardening of urban spaces and in the construction industry. However, this progress can not be attributed to PI. It is the result of a state-wide initiative on Sewerage Treatment Plants. Investment, construction and operation are done by the government.

Somewhat similar is the case for EYDAP in Athens, where the construction of the secondary treatment plant, which will treat the majority of Athens' wastewater, is being completed. This however, has been a long-term project which started in the 1980s and was managed by the Ministry of Environment with funding from the European Union. The investment plan of EYDAP after PI foresees investments for the extension of the sewerage network and the construction of smaller STPs for some distant coastal municipalities. As discussed above however, it cannot be assessed at this stage whether these investments are indeed taking place. It is therefore not possible to appraise whether PI will lead to better wastewater control.

In Buenos Aires, there have been some expansion and construction works for the wastewater treatment plants, but the verdict of the case-study analysts is overall negative. They base their assessment in some notable failures of reducing pollution of the Rio de la Plata and some characteristic contamination incidents. Their appraisal is that the concession has been followed by an increase of such failures.

In Dar es Salaam, only a small portion of wastewater is collected and treated. The existing system is in poor condition; only three out of 15 pumps work. The result is that the effluent discharged does not satisfy national or international standards. The DAWSA lease is part of the Dar es Salaam Water Supply and Sanitation Project financed by international donors. The project aims explicitly to improve sewerage collection and treatment services. The lease and the project are too recent to allow a judgement on their impacts on wastewater management.

ADN in Niteroi is a case where PI can be more clearly linked to improvements in pollution control. ADN reformed the only one existent plant prior to the concession. In addition it has constructed and operated two new plants (which now treat 43.7% of wastewater by

secondary treatment), while two more plants are to be delivered within 2004. Investments have been secured and managed by the concessionary through a combination of charges, own funds from shareholders and borrowing from investment banks. According to the case study analyst, although there are shortcomings with the regulation of the private operator, the improvement relative to the situation before the concession, is remarkable.

For ADP and NYWEASCO there is very limited information from the questionnaires or the reports (even in verbal, qualitative form) to allow an appraisal of the situation. In Limeira one major STP has been completed by the private operator, but investment and construction had been initiated by the local authority with funding from private industries, well before the concession. In Nyeri, the case-study analyst gives a positive verdict on the impacts of PI, but refers only to "repairs" on the sewerage system, without further information.

For sludge treatment, there is a notable absence of information about initiatives in all cities, probably reflecting the actual lack of initiatives. Only in Athens and Limeria there have been some preliminary feasibility studies about advanced treatment and application of the sludge in agriculture.

Energy efficiency and general environmental management

None of the case studies could provide data on the amount of energy consumed in the systems. Changes in the efficiency of energy use therefore can not be tracked. Information on initiatives was also limited. Possibly, this relates to a lack of consideration of energy efficiency as a key goal by the utilities, even after PI. It might also be the case however, that there are initiatives and that the case study analysts could not find the relevant information. For example, in Brazil since the energy crisis of 2000, there is a federal mandate to all enterprises to cut energy consumption by 20% (on average). Clearly, ADP and ADN must have implemented some policies and measures to reduce energy consumption in their operations. However, it has not been possible to get any relevant information.

Some scattered evidence of process reengineering yielding energy efficiency benefits is available from Aguascalientes (repair and improvement of groundwater wells) and Nyeri (recirculation of filter wash in drinking water treatment). These however are rather incidental and not part of broader energy efficiency initiatives.

The only case where PI can be linked to energy-related improvements is Athens. Initiatives of EYDAP after PI include the development of hydroelectric plants to capture the energy generated by water in the conveyance aqueducts, recovery of energy from wastewater treatment units and re-zoning of the network to reduce need for pumping and energy consumption. These initiatives have been promoted as part of a broader environmental management initiative of EYDAP and have benefited from EU funding.

PI in EYDAP has been accompanied generally by a more "modern" approach to environmental issues. This is reflected in the establishment of an "environment unit" within the company, the hiring of personnel with background on environmental studies and the establishment of some initiatives, such as the one for the recovery of energy or one for pollution control at the source catchments. These initiatives had a clear "market" value and potential profit (i.e. from selling energy produced and from reducing costs of treatment by agreeing with catchment polluters to control their activities). On the other hand, this progress should not be overstated. There is no committed environmental strategy or self-assessment and reporting

system established by EYDAP, nor any "brave" environmental initiative in its core areas of operation (e.g. in the river reservoirs).

In the other cases, there are scant examples of environmental management initiatives. AASA in Buenos Aires has set up a directorate for environment and has implemented an ISO 14000 self-assessment system. This has led the company to define its environmental policy, set goals and responsibilities and establish an annual (and territorialized) plan for corrective actions. There is not information yet however on the outcomes of this process.

In Dar es Salaam the lease to DAWSA has been accompanied by a regulatory initiative of the National Environmental Management Council to set up a scheme upon which to define and monitor the environmental obligations of the private operator. It is too early however to assess the efficacy and results of this scheme.

ADP in Limeira has developed a river basin clean up programme in the urban basin and has undertaken a programme for the reforestation of riparian woods and the rehabilitation of urban rivers and creeks (there is not more information on the actual results of this programme).

Horizontal appraisal

This corresponds to Part C of the questionnaire and included three basic questions:

1. An overall appraisal of effectiveness, i.e. whether after PI, even if new goals or initiatives have not been pursued, existing ones are performed more efficiently.
2. Financing. Whether PI has been followed by an increase of environmental investments and if yes, whether this increase can be attributed to the private sector.
3. Innovation. Whether PI can generally be linked to the uptake of environmentally innovative technologies or management practices.

Unfortunately, with the exception of Athens, none of the other responses provides adequate information on the above.

Conclusions

C1. The empirical information secured for this study does not allow confirming or discarding the claim that PI leads to improvement of environmental performance. Only some general insights can be raised.

C2. There is a general lack of secondary analyses about issues related to the environmental performance of WSS in the seven cities examined. Lack of environmental information is partly a consequence of lack of serious environmental management initiatives. Access to available company data and information about existing initiatives, other than that given in public relations reports, has been difficult. Collection and analysis of primary data and more in-depth analysis of utilities' initiatives was not possible given the available resources of the PRINWASS project.

C3. The assessment framework developed in this study can provide a platform for future inter-comparative research. Ideally, a Life Cycle Assessment (or other indicators- benchmarking

system) tailored to the local contexts, should be used for a more formal assessment and comparison of environmental performance.

C4. This research has assumed the presence of new initiatives after PI as an indicator of progress in environmental performance. This focus on effort rather than actual results can be misleading. In many cases, there was not sufficient data to judge whether new environmental initiatives after PI have been effectively implemented and indeed produced the results they aimed for.

C5. From the evidence of the examined cases, PI can be linked to a reduction of Un-Accounted for Water, an increase in the number of users' metered and a shift from fixed to volumetric tariffs (often accompanied by an increase of prices).

C6. Reduction of UFW is primarily due to improvements in metering (curbing illegal or unmetered uses and replacing faulty meters). From the cases examined, PI can not be linked positively or negatively with leakage control activities and improvements in the physical losses of the network.

C7. PI has not led to a control of water demand nor has it led to considerable innovation with respect to water saving technologies or water demand management activities. There is no evidence of PI leading to the implementation of conservation tariffs.

C8. There is a notable increase of investments in sewerage collection and treatment in all cities. Only in one of the seven cases examined, however, there was private sector involvement in financing and construction. In the others, it was the result of governmental action and public (or external donor) subsidisation.

C9. Sludge management, energy efficiency, nature conservation and other non-core environmental services remain outside the scope of the examined WSS utilities, even after PI.

C10. There is no notable improvement following PI in environmental planning, information available to the public (transparency) or activities for environmental awareness.
C12. Contracts with private operators have provided an important platform upon which to define new environmental goals. There is no information however to judge whether contract terms have been properly monitored and enforced. There are some indications that there were considerably deficiencies in this respect.

C13. The aforementioned conclusions are limited by the fact that one can only hypothesise on whether better or worst results would be obtained with public sector reform rather than increase in the degree of PI.

C14. The sample examined did not include any case of non-PI-based reform. Such a case would allow to test whether improvements or failures noted can be linked to PI as such or not.

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Annex I – The Questionnaire

Guidance

1. Please complete the following template responding to all answers. Where there is not enough available information, please be specific and explain why is this so (lack of information, lack of experts with relevant knowledge, uncertain data, etc).

2. Footnotes are used to provide explanations to data required and to provide further details on type of answer expected.

3. Feel free to copy-paste information from case-study reports, if available there (this is preferable than referring to case-study reports).

4. Ranking is based on a scale of five. Mark chosen value/X with Bold. Marking the third X represents a middle position between the two statements. Marking the first or the last X means that you agree with statement.

5. Please support your responses with arguments – data. Be as brief and concise as possible.

6. When not sure, use interviews with experts to arrive on a proper judgment / response to the question. If not confident, refer to the different views held by different experts.

7. When assessing trends, compare data in two moments in time (e.g. before and after PI). For certain environmental measures, it might simply suffice to note whether they have been implemented in recent years (and after PI) or not.

8. Feel free to add your own options in questions where a pre-defined set of options is already available.

9. Use as many pages as you wish in order to provide all relevant information.

10. Feel free to contact us for any clarification concerning the information required.

WSS system: <Insert name of WSS operator - system>

City / Region: <Insert name of city and/or region>

Country: <Insert name of country>

Case-study analyst: <Insert name of person(s) completing the template>

Sheet A.1 – Background data

Urban socio-economic

Population of the city (in 000s):

Rate of annual population growth (% per annum)[1]:

GDP per capita (in US $)[2]:

GDP growth per annum (%)[3]:

un-employment (%):

Water Supply and Sewerage Services

Difference between urban area and WSS area coverage:

Nº of supply service connections:

% of population connected:

Length of distribution network:

Nr of sewerage connections:

% of population served by sewerage network:

Length of sewerage network:

Level of drinking water treatment[4]:

% users metered[5]:

Sheet A.2 – Environmental characteristics

Drinking water resource-related

Describe resource system[6]:

Available freshwater resources (in million m3/yr [7] and lt/cap/day[8]):

% from surface vs. % from groundwater sources:

Competing functions for freshwater sources (describe – with data where available)[9]:

Waste-water related

Volume of sewerage produced per annum:

% treated and level of treatment[10]:

Describe sewerage recipient waters[11]:

Conflicts between sewerage disposal and other functions[12]:

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Sheet A.3 – WSS organization and Private Involvement

Is there PI in the water utility under study?

Characterise type of PI according to the classification of Figures 2 and 3[13]:

Year of change from public to PI[14]:

Describe organizational form of the public operator and regulatory system:

Identify any other major regulatory changes driving environmental performance:

Sheet A.4 – Environmental issues

Assess the importance of the following environmental issues [15] [16]

Over-abstraction of freshwater and reduction of river flows or g/w table:
Not important X X X X X Very important[17]

Deteriorating ecological condition of freshwater sources:
Not important X X X X X Very important

Land subsidence or desiccation due to falling g/w levels:
Not important X X X X X Very important

Impacts on settlements from rising g/w levels:
Not important X X X X X Very important

Environmental impacts from dam construction:
Not important X X X X X Very important

Impacts on source waters' habitats or species from abstraction:
Not important X X X X X Very important

Impacts on recipient waters' habitats or species from sewerage disposal:
Not important X X X X X Very important

Deteriorating condition of recipient waters from sewerage disposal:
Not important X X X X X Very important

Sludge disposal:
Not important X X X X X Very important

Sheet A.5 – Environmental measures

Assess the importance of the following measures

Water demand management and control of consumption
Not important X X X X X Very important

Control and reduction of losses
Not important X X X X X Very important

Improvements in energy efficiency and use of renewable sources
Not important X X X X X Very important

Improvements in sewerage treatment
Not important X X X X X Very important

Improvements in sludge disposal
Not important X X X X X Very important

If there is PI in your case, did any of the above environmental issues (sheet A.4) or measures (sheet A.5) figure prominently in the privatization debate? Explain:

Sheet A.6 – Importance of environmental issues

How would you compare the importance of environmental issues in your case with respect to the following WSS issues?

Universal provision of drinking water services – connection to the network:
Less important X X X X X More important

Universal provision of sewerage services – connection to network:
Less important X X X X X More important

Cost and affordability of water:
Less important X X X X X More important

Operational / administrative efficiency[18]:
Less important X X X X X More important

Add other as appropriate:
Less important X X X X X More important

How important were environmental issues in the privatization debate in comparison to the following issues?

Universal provision of drinking water services – connection to the network:
Less important X X X X X More important

Universal provision of sewerage services:
Less important X X X X X More important

Cost of water:
Less important X X X X X More important

Operational / administrative modernisation:
Less important X X X X X More important

Financing:
Less important X X X X X More important

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Sheet B.1 – Demand management

"<The last years> <The period after PI in WSS>[19] have seen an improvement in the uptake of demand-side management measures by the water utility".

I disagree with this statement X X X X X I agree with this statement
Explain:

"The water utility is considering demand-side options in priority over supply-augmenting options".

I disagree with this statement X X X X X I agree with this statement[20]
Explain:

Data

Trends in total freshwater abstractions [21]:

Trends in household water consumed per capita[22]:

Discussion of factors responsible for trends[23]:

There have been initiatives implemented in the following areas [24]

Integrated Resource Planning with consideration of dsm options[25]:

Demand-side designed pricing structures[26]:

Retrofit/rebate programmes[27]:

Promotion of water-efficient appliances[28]:

Information / awareness campaigns[29]:

Landscaping / efficient irrigation programmes[30]:

In-house water audits and repairs[31]:

Use of secondary water sources / differentiation of water quality according to use[32]:

Improvements in the use of the resource systems[33]:

Sheet B.2 – Losses control

"<The last years> <The period after PI in WSS> there has been an improvement in the uptake of measures to reduce water losses by the water utility".

I disagree with this statement X X X X X I agree with this statement

Explain:

Data

Trends in conveyance losses [34] (in million m^3/yr and as % of water abstracted):

Trends in distribution losses (in lt/connection/day, lt/km of network/day, million m^3 / yr and as % of distribution input [35]):

Discussion of factors responsible for trends:

There have been initiatives in the following areas [36]

Control of losses from reservoirs and aqueducts:

Leakage detection and control programmes[37]:

Active maintenance[38]:

Pipe replacement or rehabilitation[39]:

Pressure management[40]:

Sheet B.3 – Energy efficiency and renewable sources

"<The last years> <The period after PI in WSS> there have been increasing efforts to improve energy efficiency and recovery in operations and/or use of renewable energy sources by the water utility".

I disagree with this statement X X X X X I agree with this statement

Explain:

Data

Trends in energy consumed (in kWh) per m^3 of water supplied and per m^3 of sewage treated:

Trends in % of energy recovered from own operations:

Trends in % of renewable energy as part of total energy used:

There have been initiatives in the following areas [41]

Energy recovery from own operations (reservoirs, aqueducts, waste-water treatment)[42]:

Use of energy from renewable sources[43]:

Auditing and improvement of energy efficiency of internal operations[44]:

Sheet B.4 – Wastewater treatment and sludge disposal

"<The last years> <The period after PI in WSS> there have been improvements in the level and processes of waste-water treatment".

I disagree with this statement X X X X X I agree with this statement

Explain:

Data

Trends in % of w/w undergoing primary/secondary/tertiary treatment:

Trends in % and absolute quantities (in million m^3/yr) of w/w being reclaimed / recycled for other uses:

Trends in % of sewage sludge (if any) recycled or re-used:

Trends in % of compliance of w/w plants with pollutant discharge standards[45]:

There have been initiatives in the following areas [46]

Upgrading of waste-water treatment plants and processes:

Recycling/reclamation of waste-water to secondary uses (e.g. agriculture):

Treatment, disposal and re-use of sludge:

Sheet B.5 – General environmental management

"<The last years> <The period after PI in WSS> there has been a growing attention of the water utility in the improvement of the environmental performance of its processes".

I disagree with this statement X X X X X I agree with this statement

Explain:

There have been initiatives in the following areas [47]

Establishment of self-assessment systems of environmental performance[48]

Issuing of an annual environmental report:

Establishment of a specialized directorate / unit on environmental issues[49]:

Increase in the hiring of environmental scientists:

Environmental planning processes:

Specific environmental-protection initiatives[50]:

Sheet C.1 – Overall appraisal of environmental effectiveness

"Overall the environmental effectiveness of the water utility has improved <the last years> <the period after PI in WSS>".

I disagree with this statement X X X X X I agree with this statement

Support answer:

Sheet C.2 – Financing environmental measures

"<The last years> <The period after PI in WSS> there has been an increase in the financing of environmental protection – oriented measures[51]".

I disagree with this statement X X X X X I agree with this statement

"<The last years> <The period after PI in WSS> have seen an increase in the financing of environmental protection – oriented measures from private sources of"

I disagree with this statement X X X X X I agree with this statement

Explain:

Data

Trends in financing of environmental measures:

Sheet C.3 – New technologies and approaches

"<The last years> <The period after PI in WSS> there has been an increase in the adoption of innovative approaches and technologies related to environmental management and resource-use efficiency".

I disagree with this statement X X X X X I agree with this statement

Support answer:

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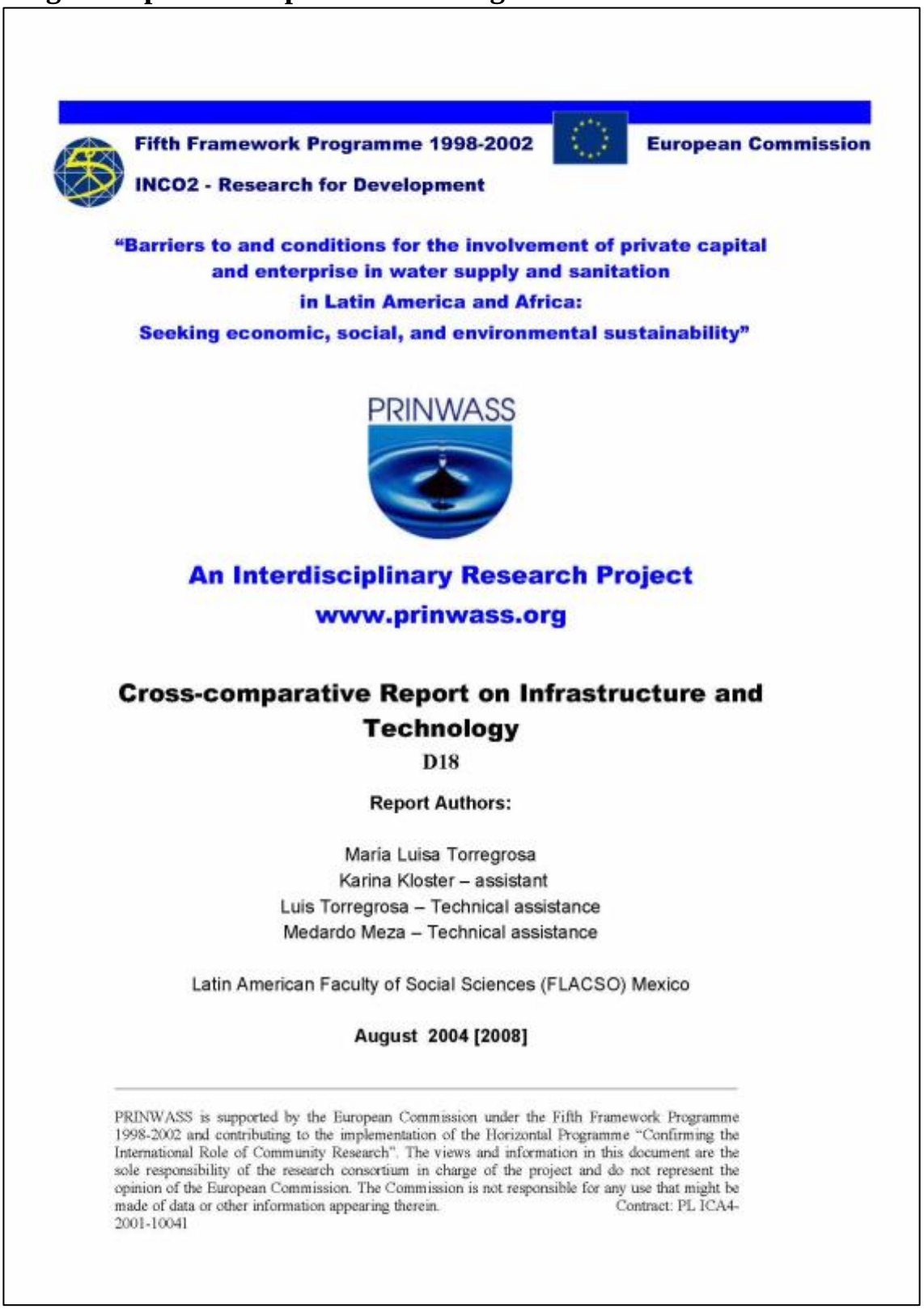
Notes

[1] Give reference year(s).
[2] Preferably at city level. If not available, then regional or national level.
[3] Give reference year(s)
[4] Describe type of treatment (e.g. disinfection, filtration, chlorination, etc).
[5] Provide figure either for % of the number of users in the service area metered or in terms of the volume of water supplied that is metered.
[6] Insert map if available.
[7] Average annual yield that can be guaranteed from the sources.
[8] Average annual yield divided by nr of people served (transformed into lt/d by multiplying by 1000 and dividing by 365).
[9] e.g. irrigation communities utilizing the same reservoir or a common groundwater aquifer; a hydro-electric power plant in the same river, etc. Focus description on important conflicts.
[10] If not applicable, describe verbally fate of sewerage (controlled - uncontrolled disposal, etc).
[11] Insert map if available. Describe location with respect to WSS or city.
[12] For example: impact on bathing waters or fisheries, etc.
[13] Use in addition verbal description when terms do not fully capture type of PI.
[14] In certain cases (e.g. UK) it is possible to identify a year when system was passed from public to private control. In other cases, this might be a more gradual process with more milestones: please describe in 2-3 sentences verbally identifying key years.
[15] If an important environmental issue in the case-study is not included (or not fully covered by existing wording), please add as appropriately and put a value accordingly.
[16] For important problems provide indicative relevant data on magnitude of problem.
[17] Mark with Bold relevant value from lowest importance (last left X) to highest importance (last X on the right).
[18] Referring to the perceived efficiency of the utility (not in the strict economic sense of the term).
[19] Delete as appropriate depending on whether the case-studied is one where PI has taken place or not.
[20] Mark the middle X if you consider that demand management options are receiving equal priority with supply-side options.
[21] Water abstracted from the resources (as metered in the abstraction point of boreholes or reservoirs). If not available, provide data on quantity of water entering the Treatment Units or water entering the distribution network.
[22] Household water consumed refers to the water metered as used by domestic users (not industries or other users). This should be divided with the number of persons served by the network (care: this is not necessarily the same to the population of the city, nor to the number of service connections). If information is not available at this level of desegregation use alternative indicators, such as total water used (and not domestic) per capita. If population data is uncertain, you can simply juxtapose trends (e.g. through a graph) in domestic water use vs. population growth in the service area (or any other division for which it can be assumed that it shows the same trends as the service area) to illustrate whether per capita consumption is increasing or decreasing.
[23] This should differentiate between demand trends as an outcome of policy initiatives (if any) vs. broader urban – demographic, socio-economic, etc – trends.
[24] Answer with a yes or no and provide where necessary, additional explanatory information.
[25] Integrated Resource Planning (IRP) contrasts to conventional planning focusing on supply-side solutions (e.g. new dams, water transfers or boreholes) to satisfy forecasted demand. In IRP various possible demand-side and supply-side options are compared together and assessed on the basis of their cost as well as other dimensions (environmental and social impacts). A mix of management options is then selected instead of the conventional decision for a new hydraulic work. Presence of an IRP should be evident in a well tractable planning procedure, as well as a detailed document where the various options are compared upon multiple dimensions. If future planning does not exist or is based only on a forecast of demands and design of a new water-work, then there is no IRP.

[26] With this we do not refer simply to an increase of prices (e.g. after PI) which might have had as a side-effect a decrease in water consumption. We refer to an explicit design of tariffs on the part of the utility with the aim to affect specific uses and classes of users in a targeted way. This should be based on a careful analysis of demand patterns of different type of users. Temporary price increases in drought periods or other extreme periods, do not qualify as such comprehensive demand-side pricing measures.
[27] This refers to programmes on the part of the utility to promote the substitution of existing water appliances with newer, more efficient ones or to retrofit existing appliances in order to use less water (e.g. provision of kits to reduce water use in WCs).
[28] This refers to programmes for the promotion and diffusion of water-efficient domestic appliances (washing machines, showers, etc) instead of non-efficient alternatives.
[29] This refers to public awareness and information campaigns for water-saving. Attention should be paid to the continuity of such campaigns (i.e. they were not implemented for a short, drought period and then "forgotten).
[30] This refers to programmes of the utility to promote efficient use of water for gardening and public space irrigation within its service area.
[31] This refers to programmes by the utility which aim to detect in-efficient use of water in houses and industries and provide advices on how to improve them (e.g. visits to industries and identification of measures to save water, audits of houses and identification of leakages).
[32] This refers to the use of polluted surface or groundwater for uses where drinking water quality is not required (e.g. in toilet flushing, gardening and public space irrigation, some industrial uses, etc).
[33] In certain cases, a better or more co-ordinated strategy of abstraction from the different sources (timing of abstraction, combination from the different sources, co-ordination with other users) may lead to saving of water resources.
[34] Conveyance losses are inferred by the difference between water abstracted from sources minus water leaving the Treatment Units (or entering the distribution network). In many cases it might be difficult to calculate this quantity as water abstracted from sources is not accurately metered.
[35] Distribution losses can be inferred from the difference between water exiting the treatment units (entering the distribution network) and final water use metered. Problems might emerge when end-use is metered; other sources of calculation should be provided in this case, making explicit the qualifications and uncertainties of this information. It is important to distinguish real losses from un-metered use (meter under-registration, water provided un-metered, illegal uses). When giving data please refer to the type of information upon which the value for losses is based.
[36] Answer with a yes or no and provide where necessary, additional explanatory information.
[37] This refers to explicit programmes for leakage detection and control (such as use of sonar detection equipment or other).
[38] This refers to regular actions of the utility to maintain the network in good condition (cleaning of pipes, etc).
[39] This refers to a proactive replacement or repair (rehabilitation) of network pipes in order to keep losses in the network (due to ageing and faulty pipes) low.
[40] This refers to control of pressure flow in the network in order to reduce leakage and occurrence of bursts.
[41] Answer with a yes or no and provide where necessary, additional explanatory information.
[42] This refers for example, to recovery of energy from wastewater treatment or production of hydroelectric energy from gravity flow of water in aqueducts.
[43] This refers for example, to utilizing energy from renewable energy providers (e.g. from solar or wind energy production units).
[44] This refers to organized programmes for energy-saving in all processes and operations of the utility (e.g. from drinking and wastewater treatment industrial processes to energy use in offices and other facilities).
[45] Discharges of w/w plants are typically regulated in terms of certain parameters: BOD, P, N. This indicator refers to the number of samples complying with the regulatory standards.
[46] Answer with a yes or no and provide where necessary, additional explanatory information.
[47] Answer with a yes or no and provide where necessary, additional explanatory information.
[48] Examples include participation in the EMAS system, own benchmarking of environmental performance, compilation and public reporting of environmental indicators.

[49] If answer is positive, please explain duty and functions of this directorate. A directorate dedicated only to w/w treatment should not be credited as an environmental unit/directorate.
[50] For example: programmes for the restoration of aquatic ecosystems; programmes for the preservation of species in source or recipient areas, etc. Note: the difference here is that the programmes target directly the ecological condition of affected ecosystems and not only the processes of the utility (although intervention in those might be involved). In the city of Amsterdam, for example, the water utility is developing a programme for the restoration and conservation of the dunes from which it draws its freshwater.
[51] Basically measures listed in sheet A5.

Original report cover published in August 2004



Fifth Framework Programme 1998-2002 European Commission

INCO2 - Research for Development

"Barriers to and conditions for the involvement of private capital and enterprise in water supply and sanitation in Latin America and Africa: Seeking economic, social, and environmental sustainability"

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Cross-comparative Report on Infrastructure and Technology

D18

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ARTICLE 6

Cross-comparative Report on Infrastructure and Technology

Maria Luisa Torregrosa,[1] Latin American Faculty of Social Sciences (FLACSO), Mexico

Karina Kloster, Luis Torregrosa, and Medardo Meza, FLACSO, Mexico

Introduction

One of the crucial challenges facing the international community in the attempt to achieve the Millennium Development Goals (MDGs) relates to the techno-infrastructural problems involved in halving the world population lacking water and sanitation services (WSS) by 2015. The target population is made up of the most underprivileged classes in urban areas as well as wide sectors of the rural population. Providing WSS to these groups is a very complex task that will not be solved simply by expanding current systems and replicating the technologies already employed in developed areas, as it is too expensive for the possibilities of many poor developing countries, and therefore will require original techno-infrastructural solutions.

Supply problems are not the only issues for water management in urban areas. In addition to availability of the resource, the characteristics of demand must be considered. This last aspect, crucial for water management, is frequently underestimated. For the most part, the "efficiency" of water management is based on measures that tend to moderate demand, but in the majority of countries and cities, even in the poorest countries, consumption is excessive and water is wasted during all phases of the system. This squander is caused by losses in networks, unnecessary consumer attitudes –encouraged by a culture of waste–, inadequate pricing policies, and water system technologies that promote unnecessary expenses. Moreover, an in the perspective of this project, WSS systems must be oriented towards achieving sustainability not just in economic and financial terms, but also in the ecological, social and political dimensions, though more often than not these aspects are looked over.

In this connection, there are many challenges faced by water operators. They must adapt to the unplanned growth of cities, and to the fact that in many cases settlements are developed without considering the water balance of the region. Furthermore, contemporary sanitary conditions imply a better quality of life but also a higher consumption of water. In addition, the operators have to supply a resource that in many societies is not valued in its social, economic, ecologic, and political multidimensionality. Under the prevailing arrangements in most countries, especially in the developing world, modern infrastructure will deteriorate over time and with few exceptions there are no

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systems in place to provide for the funds needed in the future to replace it. In practice, in most developing countries –and not few developed ones– these decisions are left to the administration of the moment which must decide how to reasonably supply WSS until the end of its term in office, leaving considerations of system sustainability –not to say intergenerational concerns– unattended.

In this context, the techno-infrastructural dimension plays a central role, since a modern system of distribution to avoid physical losses depends on the provision and maintenance of adequate infrastructure at all stages, as well as encouraging reuse of water through adequate treatment. These are essential conditions for providing safe WSS to the population without increasing withdrawal of the resource while maintaining the ecological equilibrium through adequate wastewater treatment and disposal. In this paper our aim is to compare the different case studies[2] from a techno-infrastructural perspective, in order to test the hypothesis of the mainstream model of WSS claiming that expanding private sector participation (PSP) contributes "to improve the efficiency of infrastructure services, extend their delivery to the poor, and relieve pressure on public budgets" (World Bank, 1998: 1).

We have structured this document following the main stages involved in the production of drinking water until completing the cycle, from intake to disposal or reuse, in order to observe the different systems in the case studies covered by the project and understand to what extent the introduction of PSP in the provision of water and sanitation contributes to elevating their efficiency. The first part of the document clarifies the methodological strategy deployed, followed by an analysis of the process of production of water for human consumption at each phase according to the relevant information obtained from our case studies. Finally, we will attempt to establish correlations between the different indicators and formulate some conclusions.

Lastly, it is important to note that the biggest difficulty faced by this research paper was the possibility to access reliable and updated information on WSS in order to construct indicators of efficiency.[3] We believe that this information is vital, not only to meet the objectives of this paper, but also to establish local, regional, national and international strategies to better recognize the strengths and weaknesses of the systems and revert their problems, reducing the social gap in basic services for the world population, as well as to raise awareness about the need for efficient, sustainable and equitable systems for the production and management of WSS.

[2] See Table A-1 in the Appendix for the list of urban centres considered in the case studies. As explained later, we did not manage to obtain the same quality and quantity of information about WSS technology and infrastructure for all these cases.

[3] The information gathered in the case study reports makes it difficult the comparison between cases in order to estimate efficiency, mainly because it was difficult to obtain comparable series of data for all cases. Also, we were not able to gather suitable information in all cases, which is in itself an important indicator given that access to vital information for research and monitoring is not readily available. In this regard, we obtained good information for the cases of Cochabamba, Tucumán, Buenos Aires, Lahti, and Athens, but not enough information for the cases of Aguascalientes, Kangasala, Tala and Nyeri, Dar es Salaam, Limeira, Prolagos, Niterói, and London.

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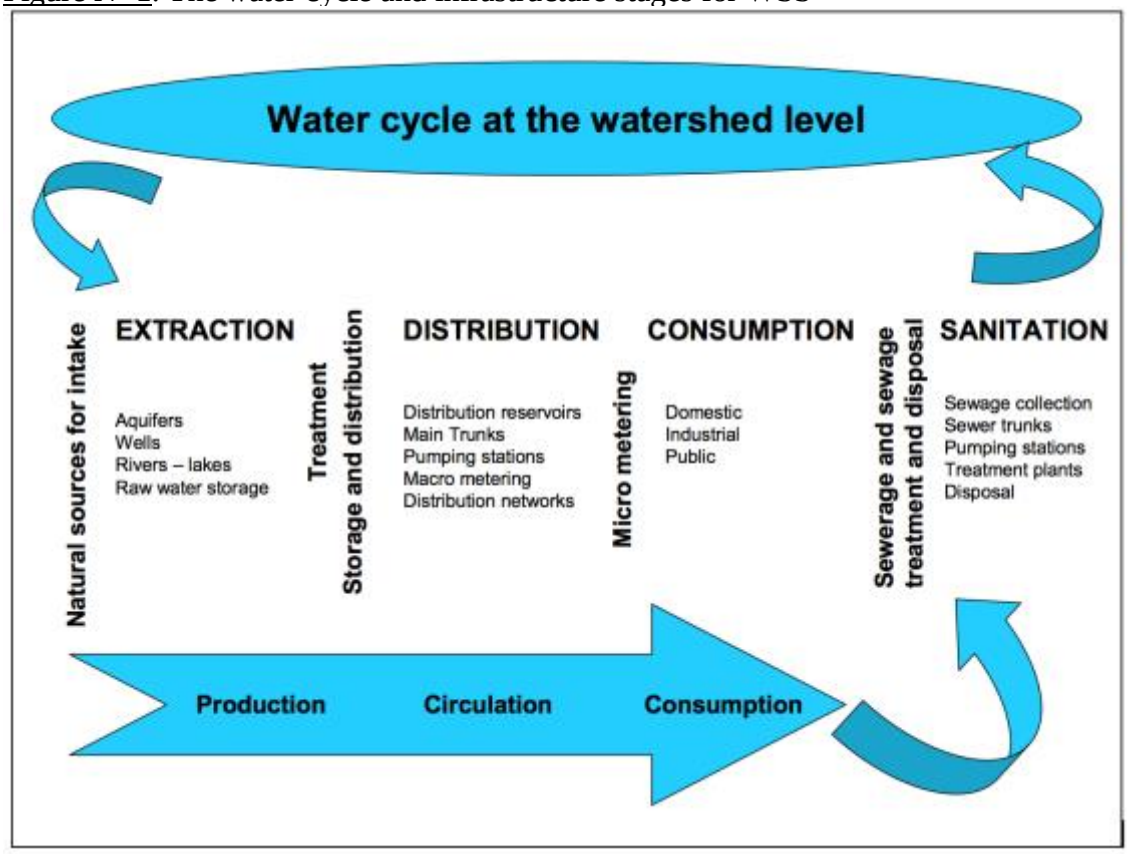
Methodology

First we sought to define the term "techno-infrastructural dimension", establishing that infrastructure constitutes planning, design, construction, operation and maintenance of mechanisms and instruments through which different tasks are carried out to achieve the social appropriation of water. Infrastructure, then, is the material base that structures the organization of the production and delivery of WSS. In order to study this process, we need to determine the different stages involved in the transformation of water from its abstraction at the source, through its adaptation for human consumption, and lastly for its safe disposal back into the aquatic environment. We have identified the following stages, as described in Figure Nº 1.

Figure Nº 1. The water cycle and infrastructure stages for WSS



The cycle of the production of water for human use begins in nature where it is generated, through the interaction of elements that make this possible, including the atmosphere, the soil, the forests, and the bodies of surface and underground water, which constitute the natural system where water is produced. In this paper, we only discuss the process beginning with human and technological intervention to access the resource, including the following stages:

- **Intake**: we are primarily interested in the type of source supplying the system, if it is underground or surface water, if it is a natural water body or a manmade reservoir, as well as the physical conditions of the infrastructure;
- **Withdrawal**: we understand withdrawal as the process of appropriation of surface and groundwater. In this sense, withdrawal involves the number of wells, the volume of water withdrawn and produced, and the infrastructure used to transport water to the distribution centers, as well as the water treatment capacity;
- **Distribution**: distribution considers the conveyance of treated water from distribution centers to the users through the distribution network. We consider the physical characteristics of the network, such as length, capacity of the mains, volume of secondary storage systems, quality controls systems, metering devices, among other, which are important in the evaluation of efficiency up to the point where water is supplied to be consumed by users;
- **Consumption**: At this stage we are interested in analyzing the ability for micro-metering and implementing technological systems that allow higher control of consumption. The metering referred to here begins when water is supplied to each user, for which a meter is installed or the water is metered by the diameter of the pipe or other mechanisms. The volume billed is an important indicator at this stage;
- **Drainage**: At this stage we understand drainage as the method used to transport wastewater to treatment plants, rivers, lagoons or the ocean. This drainage can be natural (elimination of water from a zone) or artificial, through an installation to drain polluted water. We have also considered if the system is separate or also includes rainwater drainage;
- **Sanitation**: Understood as the method used for wastewater treatment before releasing the effluents into the aquatic environment in order to maintain the equilibrium and sustainability of the natural system. The technology used and the type of use given to the treated water are also important.

Our goal was to identify in each of these stages what kind of public or private intervention existed in the management of the system, in order to answer the following questions from a techno-infrastructural perspective:

1. What can we learn from the successes and failures of PSP in the different case studies?
2. What are the difficulties for PSP in developing countries?
3. Which of these factors can affect future PSP in the provision of water and sanitation services?

In order to understand what are the pros and cons arising from PSP in relation to issues of technology and infrastructure in each case study, we will refer throughout the study to "efficiency" of management, considering this at different stages of the process of water appropriation. For each stage we will test the hypothesis that private sector participation contributes to increasing efficiency of WSS, specifically from a techno-infrastructural perspective. To confirm our hypothesis we have taken the following steps:

Definition of the "efficiency" indicator

The term "efficiency"[4] is a concept as well as an indicator. In general terms efficiency is understood to mean a positive balance between the expected benefit (using a smaller amount of water) and the cost (of using it). At the same time, there is no one kind of efficiency. Each stage of the process has a corresponding indicator that will measure efficiency, while each indicator in turn is made up of several variables which represent its empirical equivalent.

Construction of a database

Indicators have to do with theoretically defined dimensions; the empirical equivalents of those dimensions are what we call indicators. The substantial problem, therefore, is finding the empirical equivalents or indicators for dimensions which have only been defined theoretically (indicators not only make inferences possible, but also valid). In order to construct the empirical equivalent of an indicator for each kind of efficiency, we used the information contained in the infrastructure chart attached in the Appendix. This chart includes each of the stages of the process of production of water for human consumption, and in each stage the corresponding information is described for each case study considered in the research project. Based on this information, we substituted each variable with data obtained from each case study and analyzed it to find the correlation between the condition of the infrastructure and the type of administration managing it (public, private, mixed).

Temporal aspects and analysis of results

At first, this analysis was to be not only cross-sectional, but also study the evolution of the service to check if its outputs were modified as it passed through different forms of administration (public, private, mixed). Because of substantial differences in the information (caused by the impossibility of obtaining precise or comparable data), there are cases where, for instance, there is no data available about the situation of the system prior to the concession to a private operator. For those cases without sufficient information, we adopted a strategy of synchronic analysis, identifying differences between case studies depending on whether their administration was public, private or mixed. As indicated below, in the cases where there was enough information, a diachronic analysis based in the evolution of the indicators was applied.

[4] We have decided to use the term efficiency in an ad hoc fashion, adapted to the material gathered in our research, which as already pointed out is incomplete and not fully comparable across the cases. Therefore, in practice we have defined efficiency" for each stage according to the data collected.

Table Nº 1. Case studies analyzed

Region	Country	City	Character	Type of Administration	Date of concession
Latin America	Mexico	Aguascalientes	Concession	Private	1993
	Argentina	Buenos Aires	Concession	Private	1993
		Tucumán	Failed concession	Private* Public (province)	1995-1997 1997-to date
	Bolivia	Cochabamba	Failed concession	Private* Municipal	1999-2000 2000 to date
	Brazil	Niterói	Concession	Private	1999
		Limeira	Concession	Private	1995
		Lakes Region	Concession	Private	1998
Africa	Kenya	Nyeri	Concession in four phases	Private	1999
		Tala	Concession	Private	1999
	Tanzania	Dar es Salaam	Concession	Private	2003
Europe	Finland	Kangasala	Autonomous municipal	Municipal	2002
		Lahti	Joint-stock utility owned by the city of Lahti	Municipal	1994
		Lappavesi and other cities	Joint-stock utility owned by several municipalities	Supra-municipal	1972
	England	London	Concession	Private	1989
	Greece	Athens	Private shareholders own 39%	Mixed	1999

*Returned to public sector management

In total, we considered fifteen cases in nine countries from three continents, as described in Table Nº 1 (see also Table A-1 in the Appendix). In nine cases the administration of WSS is carried out through different forms of PSP, three are municipal, one has a mix of public and private ownership and management, and two are short-lived concessions to private operators that were placed back in public sector hands, Cochabamba in Bolivia and Tucumán in Argentina.

The production process

Intake stage[5]

The evaluation at the intake stage concerns the capacity of the systems to maintain the water balance within the watershed. That is, the systems' capacity to withdraw water from the available sources in a sustainable manner considering not just meeting the needs of present human populations but also preserving the ecological water balance and protecting the quality and quantity of the resource for future generations. This implies visionary planning that allows for the management of expected population growth and that take local customs into account in order to fulfill demands in the short, medium and long term, taking preventive action by, among other strategies, identifying alternative water sources, enhancing the efficiency of the water infrastructure, and fostering responsible patterns of consumption among users. Specific strategies may include demand management options, reducing leakage and other system losses, increasing water reuse, and eventually extending extraction to new underground sources.[6] Importing water from other basins is also an available option in extreme situations, although it has generated increasing controversy owing to its effect of displacing sustainability problems across watersheds.

Keeping in mind this framework, we will consider now the water sources used in our case studies (see Chart Nº 1). According to the available evidence covering 13 of the 15 cases, four cities exploit exclusively underground water sources: Aguascalientes, Tala, Kangasala and Lahti. Also, surface water is the exclusive source only in five cases: Tucumán, Niterói, Limeira, Nyeri, and Athens, while Cochabamba, Buenos Aires, London, and Dar es Salaam use different combinations of both surface and underground water resources. In the last three cases, the percentage of surface water exploited is substantially higher than the percentage of groundwater withdrawn.

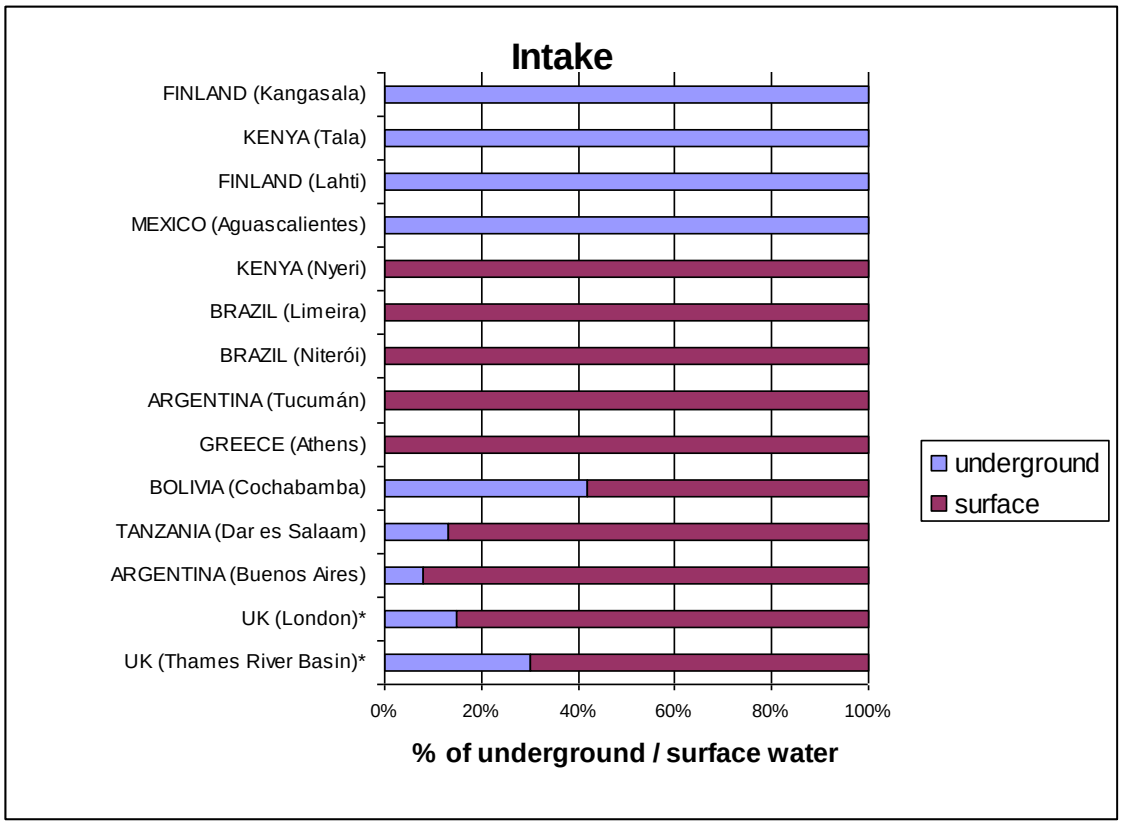
[5] Relevant considerations for the analysis at this stage:

-For measuring intake efficiency we considered the water balance between available resources and extraction. Extraction of water resources, whether surface water (rivers, lakes), underground water, or artificial reservoirs must take place without endangering the balance of the source (e.g. by over extraction, lack of prevention during drought periods, etc.).

-As already warned, unfortunately we did not obtain all the information needed to complete indicators of efficiency at this stage for all the case studies.

[6] In the case of underground water sources it is important to also consider the need to preserve the water balance between extraction and replenishment of aquifers whether through natural or artificial recharge. The evidence from many studies shows that this is seldom done and unsustainable overpumping has led to the exhaustion, or irreversible salinisation or pollution of underground freshwater resources.

Chart Nº 1. Water sources used in the case studies



* In London the proportion of surface water used is higher than the basin's average.

As a rule, water utilities have preferred, whenever possible, surface water to groundwater and the latter is used during dry periods as a reserve, although actual strategies vary depending on the hydrological characteristics of the country. For instance, as already discussed five locations among our cases meet their needs exclusively from surface water, while in four other cases surface water is also the main source. Among the latter cases, London, Dar es Salaam, and Buenos Aires extract most of the water they need from surface sources and they complement the volume required with groundwater (15-10 per cent in London, 13 percent in Dar es Salaam, and 8 percent in Buenos Aires). In Cochabamba the proportions are more balanced, with 58 percent extracted from groundwater, and the remaining 42 percent from surface resources.

In the four locations that use water solely from underground sources, two have already problems of aquifer overexploitation (Aguascalientes and Lahti). This does not mean, however, that the demand of water is not been satisfied in these locations, but that actions[7] need to be taken to induce recharge when overexploitation of the aquifer occurs

[7] Possible actions include storing water in the upper parts of the basin to induce recharge of the aquifer. Also, it would feasible to design a system of separate rainwater and wastewater drainage, collecting rainwater in permeable deposits that allow water to enter the aquifer, thus increasing recharge. Another possibility is designing systems to gather rainwater in homes, and using permeable soil in urban zones, all

in order to ensure the sustainability of the resource. For example, in the case of Aguascalientes 90 percent of water extracted is destined for agriculture, so it would make a significant difference to try to rescue large volumes of water by upgrading irrigation systems, changing cultivation patterns (e.g. by introducing alternative crops), introducing more rational systems of water charging, among other feasible strategies to use the resource more efficiently. In this particular case, saving water currently lost through the inefficient irrigation infrastructure would allow to increase the volumes available for human consumption and the recuperation of the aquifer.

In the cases supplied solely with surface water, the future availability of the resources does not seem to be the main cause of concern. Here the most urgent problems are related to water quality, given that the resources have become polluted by a variety of processes including the disposal of increasing volumes of untreated wastewater but also diffuse pollution sources such as agricultural runoff leaching pesticides and other chemicals as well as organic waste into water sources, as reported in the cases of Buenos Aires, Tucumán, and London. In this situation there is a serious problem derived from the mounting costs involved in the improvement and maintenance of both water treatment for human consumption and sewerage and wastewater treatment for reuse and disposal of wastewater. In the case of London, for instance, 12 percent of the water distributed for human consumption is recycled wastewater, but during peak periods in dry summers the volume of reuse can reach up to 70 percent of the water distributed in the metropolis.

Withdrawal, transportation and purification stage

In analyzing efficiency at this stage we considered the conditions of the infrastructure for withdrawal and purification of water, as well as the policies involved in this particular part of the process, such as the standards set for the treatment and distribution of drinking water. The characteristics and conditions of this stage offer a fairly good parameter to evaluate the grade of overall system efficiency, as a balance can be made between the volume of water removed from the source and the volume that later arrives to be treated or stored in a tank for subsequent distribution.[8]

Initially, to have a broad comparative picture we estimated the ratio between the volume of water abstracted by the water utility in each case study and the total population (Table 2). This is not a very precise indicator, as we have very dissimilar situations such as cities with a very low proportion of the population connected to the network to other cases where data are not available for the city but for the whole watershed, which is

methods being already applied in many places, and some of them based on technologies several thousand years old (e.g. rainwater collection devices).

[8] In order to define efficiency at the withdrawal stage we needed information that was not available in our cases, such as volume of water extracted from the source and volume arriving at the distribution storage point (before reaching the distribution network). Also, we would need to know the characteristics and conditions of the network from the source to the distribution storage point (treatment plants, storage tanks, storage reservoirs, etc.). This information is needed to estimate losses occurred during the withdrawal of water and its conveyance up to the distribution points, which would allow an evaluation of the level of maintenance and renewal of the system.

served by the same company, as in the case of London.[9] However, this comparison offers a first overview of the situation in the different cases that will be later specified when analyzing more precise indicators related to actual distribution and consumption of water.

Table Nº 2. Water produced at distribution point (litres per capita per day [l/c/d])

Case	Population	Water produced at distribution point (l/c/d)
Tala (Kenya)	22,375	7*
Nyeri (Kenya)	120,000	164
Kangasala (Finland)	19,700	172
Dar es Salaam (Tanzania)	2,500,000	184
Limeira (Brazil)	249,246	194
Niterói (Brazil)	458,465	206
Thames River Basin** (UK)	7,941,000**	346
Lahti (Finland)	95,000	371
Aguascalientes (Mexico)	594,092	413
Athens (Greece)	3,120,000	520
Buenos Aires (Argentina)	9,112,598	564
Tucumán (Argentina)	1,333,416	570

* This is a special case where the water utility only covers 30% of the population
** Only the population served by RWE-Thames Water (water supply)

As shown in Table Nº 2, in Tala there is an average production of drinking water of 7 liters per capita per day (l/c/d). This level of production is very low compared to the rest of the case studies, because from a technical infrastructural perspective, the situation in Kenya, and especially in Tala, is totally different from the other cases. Only 30 percent of the population is officially connected to the network, and most people receive water through communal water taps where they obtain the minimum amount of water needed of survival, far below the international recommendations and from the level of provision observed in the other public and private water operators analyzed in this study.

Always keeping in mind that the information presented in Table 2 may have important gaps and therefore must be read with caution, it is also interesting to highlight some important trends that seem to emerge from these figures. Firstly, although there are significant differences between the cities in the amount of water per capita produced, in all cases with the exception of Tala the figure is well above the internationally recommended minimum daily water volume of around 100 litres per household or 40-50 litres per person. In fact the combined average production of drinking water in these cities is 310 l/c/d. This is very relevant information indicating that the main problems affecting WSS in these cities are issues of distribution and access to the service, and are not

[9] Data available for the company RWE-Thames Water covers parts of the London population and most of the population in the whole Thames River Basin, and therefore using data at this level of aggregation hides important differences between sub-regions and cities within the basin.

primarily related to the volumes available.

Secondly, from a general perspective it seems that production of drinking water is predominantly higher in bigger cities, and conversely lower in smaller urban centers, with the following exceptions: Lahti, one of the cities with the smallest population, has a higher than average production of drinking water (l/c/d), and Dar es Salaam, a relatively large city, has a lower than average l/c/d figure. However, there seems to be an even stronger association between a high l/c/d figure and high population density, as with the exception of Aguascalientes that has a low density (69.8 persons per square km) and Lahti with a moderate density (726 p/sq/km), all other cities with high l/c/d have also high density scores: Buenos Aires (13,679.6 p/sq/km), Athens (6,979 p/sq/km), Tucumán (5,862.3 p/sq/km), and London (4,480 p/sq/km).[10] This is consistent with the established knowledge suggesting that once the problems of availability of water resources are overcome, drinking water supply is higher in large cities since they usually have more infrastructure and services, as well as more communication with the outside world, affecting patterns and sanitary customs which in turn use more water. Also, water supply in cities does not only include domestic consumption, but also water used in urban industries (though this is declining in some cases like London and Buenos Aires), businesses, and public areas such as parks and buildings which tend to boost water demand.

Thirdly, as discussed earlier in relation to Chart Nº 1, we can see that there seems to be little correspondence between type of water sources and volume of drinking water produced per capita. For instance, Aguascalientes and Lahti, cities supplied solely by underground sources, have a higher than average availability of water (l/c/d). It is revealing that Aguascalientes, which has serious problems of overexploitation of the aquifer, has one of the highest levels of water production measured in l/c/d, well above the recommended international standards. Conversely, in Tala where there are no problems of aquifer overexploitation, the production of water is very low because of very limited infrastructural development. Likewise, the use of mixed surface and underground sources does not seem to determine production capacity either, since Buenos Aires has a higher than average l/c/d, while Dar es Salaam has a figure well below the average. Similarly, cities supplied only from surface water, have also high variations in their l/c/d, with the Brazilian cities scoring a below average l/c/d and the cases of Greece and Tucumán showing a significantly higher than average figure.

From another angle, and looking now at problems of efficiency in conveyance (from the point of intake to the regulation tanks or treatment plants), it should be kept in mind that losses are higher for locations supplied mainly or solely from surface sources, because in these cases water is generally gathered through dams and open air intakes. In addition, water is transported from the point of withdrawal to the regulation tanks or treatment plants in canals, as observed in the case of Cochabamba. In this stage of the process, losses of around or over 50 percent are not uncommon because of infiltration problems in the canals and evaporation. For instance, this is reported in the case of the Lakes Region where 17 percent of the volume withdrawn is lost during the transportation stage to the treatment plants.

[10] For a discussion of this association between population density and water use in the context of the urban characteristics of the PRINWASS case studies, see Crenzel and Forte (Article 4 in this publication).

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In the case of locations supplied with groundwater, losses are generally lower at this stage, since normally purification processes are carried out directly after withdrawal from wells, and therefore the conveyance takes place through pipelines which significantly reduce losses by infiltration or evaporation typical of the open canals. Although in most studies it is not reported, in these cases there is an approximate efficiency of 95 percent.[11] There are no great losses since the systems have few branches, and in general they are highly controlled since they form the primary section of the supply network, the function of which is simply to transport water from the source to the treatment plants and distribution tanks.

Regarding the quality of the drinking water produced in this stage of the process, according to the information available only two cases among the cities studied do not conform to the required quality standards: Cochabamba and Tala. In the case of Cochabamba, only 80 percent of samples meet the standards for drinking water quality, while in Tala the users of the private company continue to boil water before using it as there is a widespread perception that the safety of water delivered for human use is not guaranteed. In Aguascalientes, water from some wells has excess of fluoride and is not given adequate treatment, but 98 percent of the samples fulfill parameters of quality. Athens, London and Tucuman show a high proportion of tests that meet the quality standards (98, 99.84, and 100 percent respectively), while Lahti and Kangasala also report good quality water. For the rest of the cases, there was no information available.

In general, it can be said that the parameters to consider whether water meets the required standards for safe human consumption or not vary depending on the restrictions set by local governments or international organisms. Also, the parameters in some developing countries are lax compared to developed countries, and a proportional increase between quality of water and cost of purification can be clearly established. Lastly, in most cases of purification, surface water shows more sediment and lower quality compared to groundwater. This demonstrates the need for better treatment infrastructure and a higher cost of operation of treatment plants for surface waters compared to the treatment of groundwater. An example is the case of Lahti where, because of natural conditions, layers of earth act as filters and withdraw high quality water, since the aquifer is not polluted or overexploited for long periods of time. If overexploitation occurs, the problem of poor quality fossil water can occur, which is a mid term issue in Aguascalientes, where there are currently significant levels of sulfur much higher than the norm in some of the wells that supply the city.

Distribution stage

This stage in the process of producing water for human consumption, the distribution network, aims to supply the user with an adequate quantity and quality of water. In networked drinking water systems, for the service to be continuous and safe the right level of pressure has to be maintained in order to reach all users and avoid pollution of

[11] This may be much lower in some cases, for instance in London, where a large section of the water infrastructure has not been replaced since the nineteenth century and higher than average leakage continues to be one of the most important problems facing the water utility.

the supply. In this stage, the characteristics and condition of the infrastructure are also very important, and indicators such as the length of the tubes (according to the diameter of the intake lines, the main pipes, and the secondary lines) as well as population coverage can provide information about the level of efficiency in the system.

Within the techno-infrastructural dimension, distribution is one of the variables that most affect system efficiency, since here is where most problems occur. Among our cities, for instance, in most cases, except in Finland, the complication most often faced by water operators is the lack of renewal of the pipelines. As a rule, pipes are only changed in small sections where there are leaks, and one of the crucial problems facing public water utilities, especially in developing countries, has been the structural lack of financing for renewal of sunken infrastructure. This was precisely one of the key arguments to promote PSP in the water and sanitation sector, based on the claim that introducing the private sector in WSS would "provide specialized expertise, efficient management and new sources of capital" (WSP-PPIAF, 2002: 8-10). However, the evidence shows that even when the water operators have been able to improve the commercial efficiency and increase revenue –helped by the steep tariff increases that have normally accompanied private concessions– investment in pipe renewal continues to lag well behind. Moreover, the private operators have tended to put first the interest of their shareholders rather than committing their own capital to fund the much needed works.[12] In general, water utilities tend to budget operation and expansion costs while the existing infrastructure is mainly considered from the perspective of maintenance, even in cases where the operators are obliged by contract to renew pipelines and there is strict regulation in place. However, the evidence from our case study material shows that strict regulation and monitoring of compliance with contractual commitments has been the exception rather than the rule,[13] and consequently the lack of investment in infrastructure renewal continues to underscore the loss of large volumes of water in most cities.

As to be expected, a water distribution network can have leaks that cause losses, the magnitude of which depends on the conditions of the network such as type of piping material, age, quality of maintenance, rate of replacement, the existence of clandestine connections and other forms of uncontrolled water use. In this regard, wherever possible we have kept the distinction between different components of the concept of efficiency, such as infrastructural and commercial efficiency, since water losses due to network deterioration have very different causal factors and consequences than commercial losses derived from inefficient management of billing systems and fee collection or outright non payment of water bills by the users. In the following analysis we have been able to distinguish between the two aspects only in some cases, owing to the paucity of the available information, and therefore the figures often indicate only aggregated total losses or "unaccounted for water". In some cases, though, we have been able to provide separate

[12] The best examples, among our case studies, are the Thames River basin in England and Buenos Aires in Argentina, where after over one decade of PSP the original investment commitments in infrastructure renewal have not been met and the situation has been deteriorating in the last few years. However, lack of compliance with investment commitments in the original concession contracts have been identified in all cases studied (Azpiazu and Schorr, Article 2 in this publication).

[13] For a more detailed consideration of PRINWASS' findings in relation to regulatory controls in the case studies, see Azpiazu and Schoor, and Castro, Articles 2 and 1 respectively in this publication.

data for strictly physical losses that measure the difference between the volume of treated water produced and the volume effectively supplied to the users, but even this information may not be entirely reliable as observed by the relevant regulators.[14] Table Nº 3 shows the overall results for efficiency at the distribution stage.

Table Nº 3. Efficiency at the distribution stage and type of source

Case studies	Type of operator	Type of source	Efficiency (%)
Lahti (Finland)	Municipal	Underground	93[a]
Limeira (Brazil)	Private	Surface	83[c]
Kangasala (Finland)	Municipal	Underground	79 [a]
Niterói (Brazil)	Private	Surface	76
Athens (Greece)	Mixed	Surface	75 [a]
Cochabamba (Bolivia)	Municipal*	Mixed (42% surface)	75
Thames Basin (UK)	Private	Mixed (70% surface)	74.5
Buenos Aires (Argentina)	Private	Mixed (92% surface)	68 [a]
Tucumán (Argentina)	Public (provincial)**	Surface	62 [a]
Tala (Kenya)	Private	Underground	60 [a]
Das Es Salaam (Tanzania)	Private	Mixed (87% surface)	60
Aguascalientes (Mexico)	Private	Underground	56
Lakes Region (Brazil)	Private	Surface	55[b]
Nyeri (Kenya)	Private	Surface	55 [a]

*Failed private concession (1999-2000), taken over by the municipality.
** Failed private concession (1995-1997), taken over by the provincial government.
[a] Includes physical and non physical losses, unaccounted for water.[15]
[b] The report mentions significant losses because of clandestine intakes.
[c] Includes physical and financial losses.

[14] This is, for instance, the case in England and Wales where the regulator OFWAT has warned that data on water losses provided by the private company, on which the regulator relies, may not be entirely reliable.

[15] Water unaccounted for is made up of all water losses related to water used in treatment processes, as well as non-metered water and non-paid-for water.

According to the figures of Table Nº 3 the general average efficiency for total losses is 70 percent, although there are high variations between the cases. Comparing the type of losses, we can see that the average efficiency for physical loss (Niterói, Dar es Salaam, Aguascalientes, the Thames Basin, Cochabamba, and the Lakes Region) is 66 percent, while in cases where total losses are included (unaccounted for water), the average is 71.90 percent. Although this is not a big difference, it shows that the main problem for efficiency is caused by physical losses. All the cases that presented data for physical losses in the system, Dar es Salaam, Niterói, Aguascalientes, the Thames River basin, the Lakes Region, and Cochabamba, have systems operated by the private sector, except in the case of Cochabamba, where the private concession only lasted for a few months. In the cases classified on the basis of unaccounted for water –a more general parameter–, there are some private and some decentralized public operators, which seem to be more efficient although we do not have data on physical losses.

The analysis shows that cities with more than 500,000 residents have an average efficiency of 67 percent, below the general average, and smaller cities have an average efficiency of 72 percent. Although the variation is small, we assume that because water systems are more extensive and complex in bigger cities, maintenance and operation are much more difficult, although larger cities also tend to have an ageing water infrastructure that has not been renewed for decades, like in the case of London where an important part of the network dates back to the nineteenth century.

Table Nº 4 shows that two European cities and one South American city have reasonably good efficiency, of more than 80 percent. The two cities occupying the first two places are located in Finland and have decentralized municipal water operators, while the third is Limeira in Brazil.[16] Another interesting piece of data shown by this table is the piping rate associated with efficiency. Table 4 shows that the four most efficient systems have the highest piping rates, although Dar es Salaam lacks data. This allows us to establish the hypothesis that losses occur in branches: the more taps included on a short amount of piping, the pipes are more likely to leak. The average "piping rate" for the eleven locations for which we have information, is 3.2 km of piping per resident.

[16] In our original classification we had also included in the comparison for Total Efficiency the company RWE-Thames Water, which serves the Thames River basin in England. According to the data available this company ranked fourth among our cases, with 82 per cent. However, we decided to drop it from the list owing to the fact that in the most recent assessment carried out by the regulator OFWAT RWE-Thames Water was considered as one of the most inefficient companies in England and Wales, and the reliability of the information available about the company's leakage rates has been called into question (Castro, 2003). See also our comments to Table Nº 5 later in this section.

Table Nº 4. Efficiency at the distribution stage by population size

Case studies	Number of residents	Total Efficiency * (%)	**Piping Rate (Km of piping/res.)
Thames River basin (UK)	13,209,100***	---	4.0***
Buenos Aires (Argentina)	9,112,598	68*	2.2
Athens (Greece)	3,120,000	75*	2.5
Dar Es Salaam (Tanzania)	2,500,000	60	-----
Tucumán (Argentina)	1,333,416	62*	2.1
Aguascalientes (Mexico)	594,092	56	2.4
Niterói (Brazil)	458,465	76	2.6
Limeira (Brazil)	249,246	83*	3.8
Nyeri (Kenya)	120,000	55*	2.5
Lahti (Finland)	95,000	93*	4.8
Tala (Kenya)	22,375	60	0.4
Kangasala (Finland)	19,700	86*	8.7

* Total efficiency in % (100 minus percentage of water unaccounted for).
** The "piping rate" was obtained considering the length of piping in the network divided by the number of residents who receive the service.
*** Only considering the sector supplied by RWE-Thames Water (31,000 km for 7,679,000 residents).

We can conclude that, in general, the distribution systems are obsolete because in most cases the working life of the pipes has already expired, which underscores the high physical losses reported in the systems (see Table Nº 5).

Table Nº 5. Condition of the distribution network in the case studies

Country	City	Type of Administration	Condition of Network
Mexico	Aguascalientes	Private	Ageing
Argentina	Buenos Aires	Private	Ageing. Investment for network extension
	Tucumán	Public (provincial)*	Ageing. No investment made during the private concession
Bolivia	Cochabamba	Municipal**	No extension or improvement of the network since 1990
Brazil	Niterói	Private	Ageing. Investment for network extension
	Limeira	Private	Ageing. Investment for network extension
Kenya	Nyeri	Private	Ageing. Investment for network extension
	Tala	Private	Ageing
Tanzania	Dar es Salaam	Private	Decaying infrastructure
Finland	Kangasala	Municipal	In good condition
	Lahti	Municipal	In good condition
United Kingdom	Thames River basin	Private	Ageing. Despite some important investments the distribution network is deteriorating
Greece	Athens	Mixed	An important development in infrastructure was made in the 1980s. In good condition.

* Failed private concession (1995-1997), taken over by the provincial government.
** Failed private concession (1999-2000), taken over by the municipality.

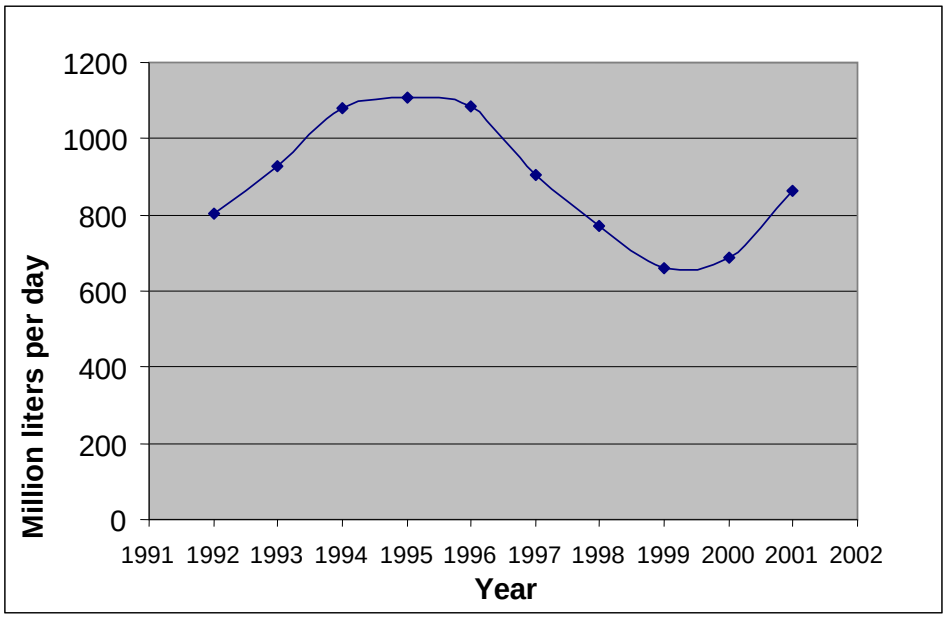
This is confirmed by the information on the kinds of material of which pipes are made. In the cases where information was available, high percentages of piping are reported to be made of galvanized steel, a material generally discontinued in the 1970s and 1980s and replaced with asbestos and later with PVC. These data constitute an indicator of the large-scale of obsolescence in the infrastructure of most distribution systems whereby as general rule very old networks laid many decades ago have not been renewed, adequate maintenance is often a rare occurrence, and in most cases new piping is only considered for expanding the system or for replacing network sections with huge leaks.

In this regard, as already stated the main technical-infrastructural problems facing the provision of drinking water can be identified in the distribution stage. The biggest

challenge faced by both public and private operators is modernizing the distribution systems, which in most cases are obsolete and need strong investment to offer an adequate service. However, as the ongoing debate in England and Wales suggests, in the trade off between repairing ageing distribution networks to reduce mounting physical losses and environmental stress and developing new resources such as raw water storage reservoirs, the water utilities often prefer the second, even against the recommendation of the relevant regulatory bodies. To the ecological concept of efficiency, that prioritizes leakage reduction and demand management measures to encourage sustainability in basin management, the private companies have counter argued with the concept of economically efficient level of leakage, which implies that reducing leakage under a certain level determined by the specific conditions of the system may not be worth the investment. This position, for instance, underscores to a large extent the worsening leakage problem in the Thames River basin, discussed below.

In this connection, and because of the weight of the distribution stage for the techno-infrastructural dimension, we decided to explore the evolution of efficiency in relation to unaccounted for water over the years for those cases where data was available. As it can be observed in the case of London, physical losses in the distribution system increased after the privatization in 1989 because investment in much needed pipe renewal continued to lag well behind the system's requirements. After a prolonged draught in 1995-96 prompted a far-reaching review of the private companies' compliance with investment targets by the regulator OFWAT, aggressive plans to reduce leaks were implemented and losses were reduced for a short while. However, since 1999 there has been again a substantial increase in water losses as illustrated by Chart Nº 2.

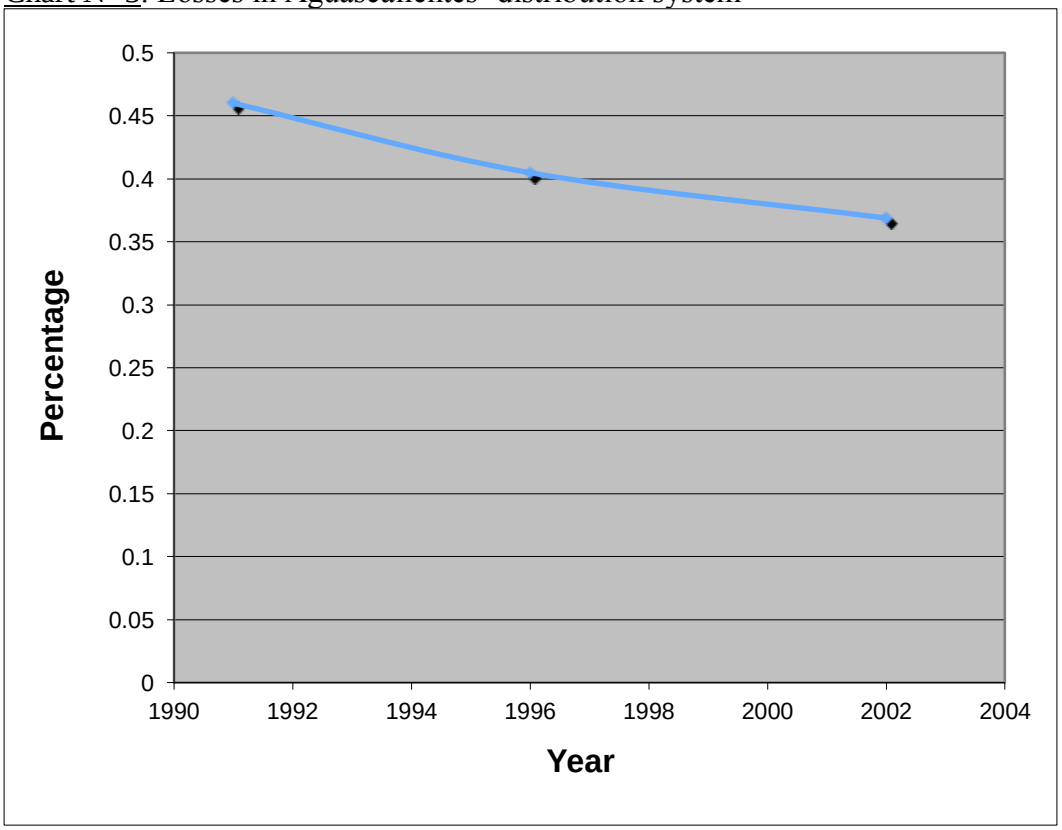
Chart Nº 2. Physical losses in the Thames River basin distribution system



Despite huge investments in high-tech infrastructure like the London Ring Main completed in 1994 or the North London Artificial Recharge scheme in the Lee River Valley which played a central role in alleviating the problems caused by the 1995-6 drought, RWE-Thames Water is one of the worst performers according to the "Security of supply" assessment published in 2003 by the regulator OFWAT. The situation is particularly problematic in London, where 76 per cent of users are at risk of having their normal service interrupted or otherwise affected. This is compounded by the high leakage levels of the company, which were three times higher than the industry average in 2003: measured in m3 per km per day (m3/km/d), in 2002-03 RWE-Thames Water had an average leakage of 30 m3/km/d against the average level of the industry of 11 m3/km/d. According to OFWAT, leakage levels in the RWE-Thames Water area are rising and not improving as expected, and the water infrastructure of this company is deteriorating (Castro, 2003).

In the case of Aguascalientes, after the concession was granted in 1993 the operator adopted an aggressive strategy to reduce losses, but this effort slowed down after the 1994 crisis and subsequent "rescue" of the private operator by the state (Chart Nº 3).

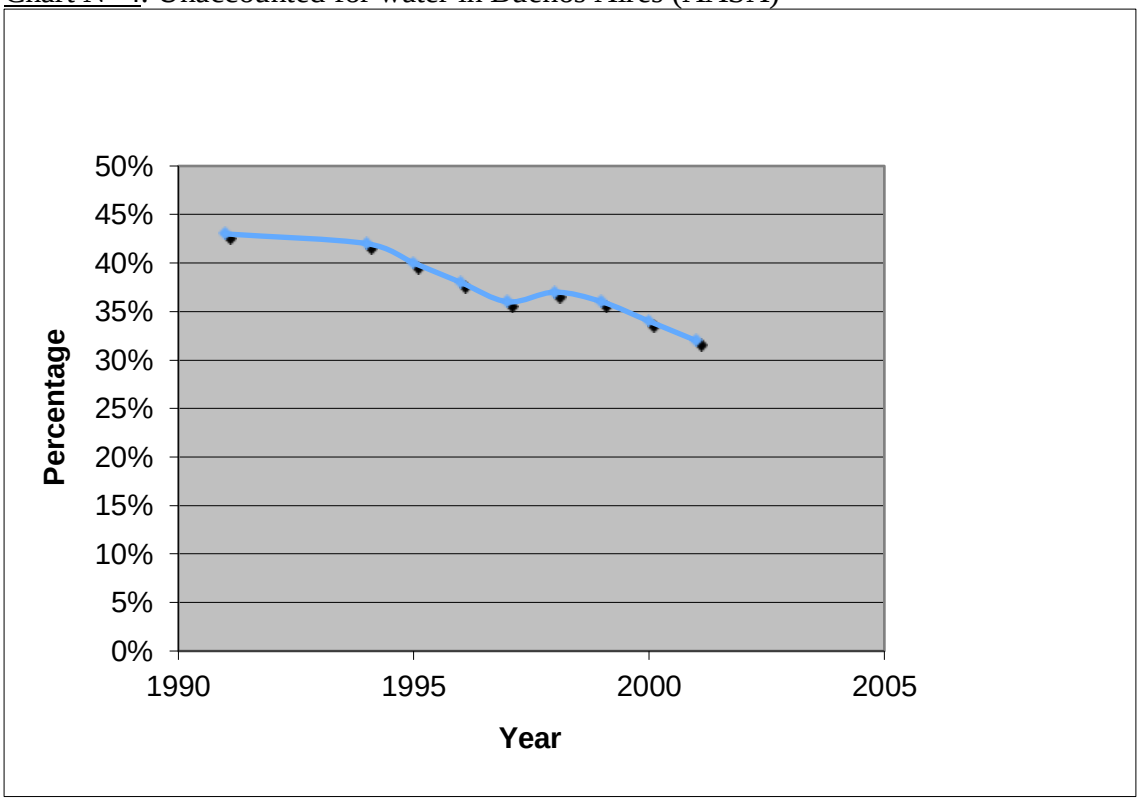
Chart Nº 3. Losses in Aguascalientes' distribution system



In Buenos Aires, data for the private consortium Aguas Argentinas (AASA) do not specify physical losses but the percentage of total unaccounted for water. Chart 4

shows that total losses were lowered by more than 10 percentage points since the concession was granted in 1993, which must have improved the system conditions, although it is not clear whether the improvement has been through reducing physical losses or because there has been an enhancement of commercial management (billing and collection of fees). However, the information provided by the regulator ETOSS suggests that the improvements have not taken place in the renewal of infrastructure, as leakage levels remain very high and cause problems of low pressure in the drinking water network affecting approximately 70 percent of the users, which has prompted the regulator to apply significant fines to the company.[17]

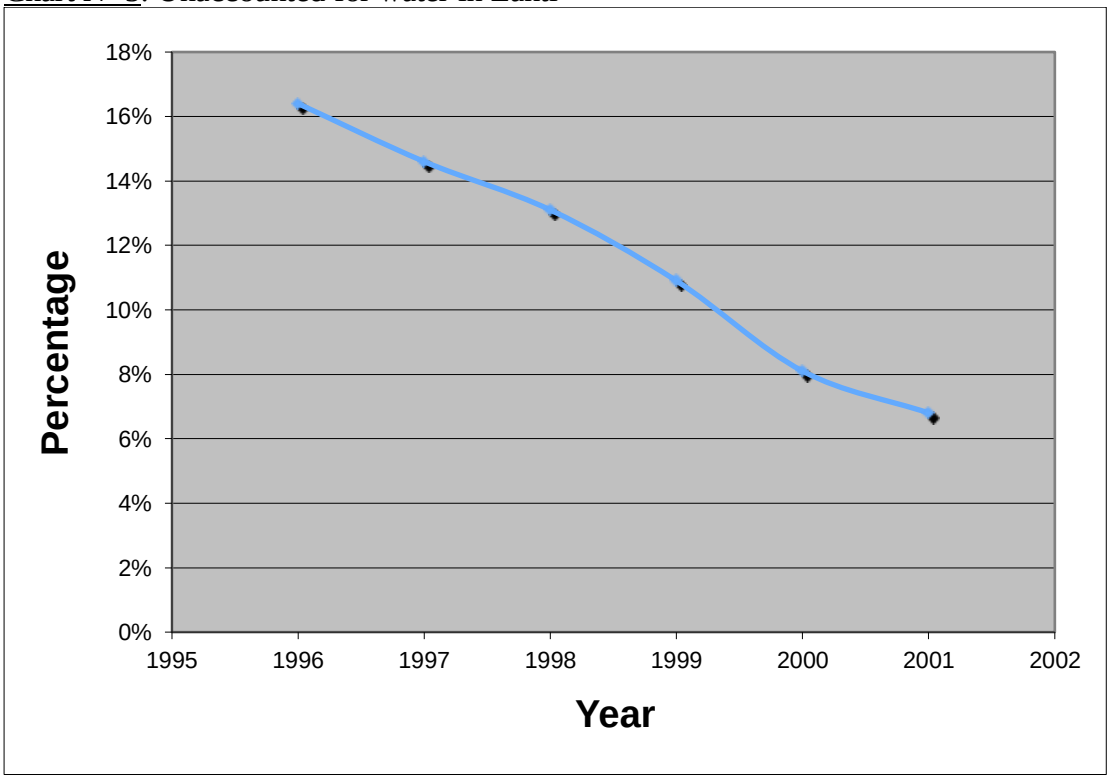
Chart Nº 4. Unaccounted for water in Buenos Aires (AASA)



In Lahti the distribution system started at an already lower-than-average level of unaccounted for water at 16 percent, and the substantial reduction achieved during the 1990s by around 10 percentage points suggests that this company has been highly effective in reducing total losses. As already discussed, below a certain level of water losses –that some experts estimate at around 10-12 percent– further reductions become more difficult and costlier.

[17] Azpiazu et. al. (2003). The fines, totalling around 40 million pesos (11.2 million euros) cover these and other problems of non compliance with contractual commitments. The operator only paid part of this amount, and the collection of the remaining amount has now been suspended as part of the ongoing negotiations between the company and the federal government.

Chart Nº 5. Unaccounted for water in Lahti



Summing up this section, in the few cases for which we have obtained a data series for at least a period of years to explore the evolution of water losses in the distribution systems, we can see mixed results. On the one hand, there is an overall trend in three of the four cases involving both public and private utilities towards reducing the level of unaccounted for water and, to a lesser extent, physical system losses. On the other hand however, there are also some cases like the company RWE-Thames Water in England that after a short period of improvement have reverted to a situation of rapid deterioration of the distribution system infrastructure, while in Aguascalientes, after an initial impulse towards renewal of the distribution infrastructure, the efforts have also been slowed down.

However, the overall pattern as captured in Table Nº 5 shows a situation of widespread deterioration of the existing infrastructure, with exception of Finland and Greece where the public utilities have invested heavily in infrastructure renewal and the systems are reported to be in very good condition. In most other cases, investment in infrastructure tends to be concentrated in the expansion of the network to increase coverage, mostly in the developing country cases which we consider in the following section. These trends, although providing only an incomplete picture because of the paucity of the available information, suggests that more substantial efforts will be needed in order to reverse this pattern of long-term decay and obsolescence characterizing most drinking water distribution systems. In general, the introduction of PSP does not seem to have produced the investment in infrastructure renewal that is claimed in the mainstream

WSS policies, and improvements tend to be associated with the commercial aspects rather than with the reduction of physical losses through infrastructure renewal. We will come back to these issues later, but let us now focus on the consumption stage, starting with the indicators for drinking water coverage.

The consumption stage

At this stage of the production of drinking water we can discuss techno-infrastructural efficiency in terms of the levels of coverage achieved by the water utilities. This phase of the process is very important from the perspective of MDGs, which aim at halving the population without access to safe drinking water by 2015. In this regard, a clear trend can be identified here as private operators in developing countries have prioritized their investments in this phase rather than in renewal of old infrastructure, as discussed in the previous section. This is a logical consequence of the fact that for-profit operators in general have a higher incentive to maximize revenue by increasing water sales than to invest in infrastructure renewal or reduce water consumption by implementing water demand management instruments such as micro-metering. Nevertheless, within this overall trend there are significant differences in the strategies adopted in the cases, for instance in the expansion of coverage to the poorest sectors of the population, which as a result of financial and commercial considerations are unattractive customers for the private companies, or in the deployment of systems for improving control over water demand and consumption such as the installation of water meters. Let us examine first the question of drinking water coverage.

Drinking water coverage

For the comparative analysis we have classified the cases into three main groups, according to their level of coverage of the target population: "high" with 90 percent of the population or over, "medium" with between 60 and 89 percent, and "low" with less than 60 percent of the population (Table Nº 6). However, it is important to highlight some important caveats here in order to reduce the chances of misinterpretation of the information in the table. As shown later in Table Nº 11, the actual period of PSP presence in most cases has been comparatively short, with the exception perhaps of the Thames River basin (15 years), Buenos Aires and Aguascalientes (11 years), and Limeira (9 years). In two cases, Cochabamba and Tucumán, the PSP presence was extremely short as to make any difference to the long-term performance of the drinking water coverage of the relevant water utilities. The picture offered by Table 6 is complemented with Charts 6-8 that show the evolution of coverage in a few cases for which information for a period of years was available. Among other issues, this information is crucial because in most cases showing a high level of coverage for drinking water, this had already being attained by the public operators before PSP was introduced.

Table Nº 6. Reported level of coverage for drinking water supply

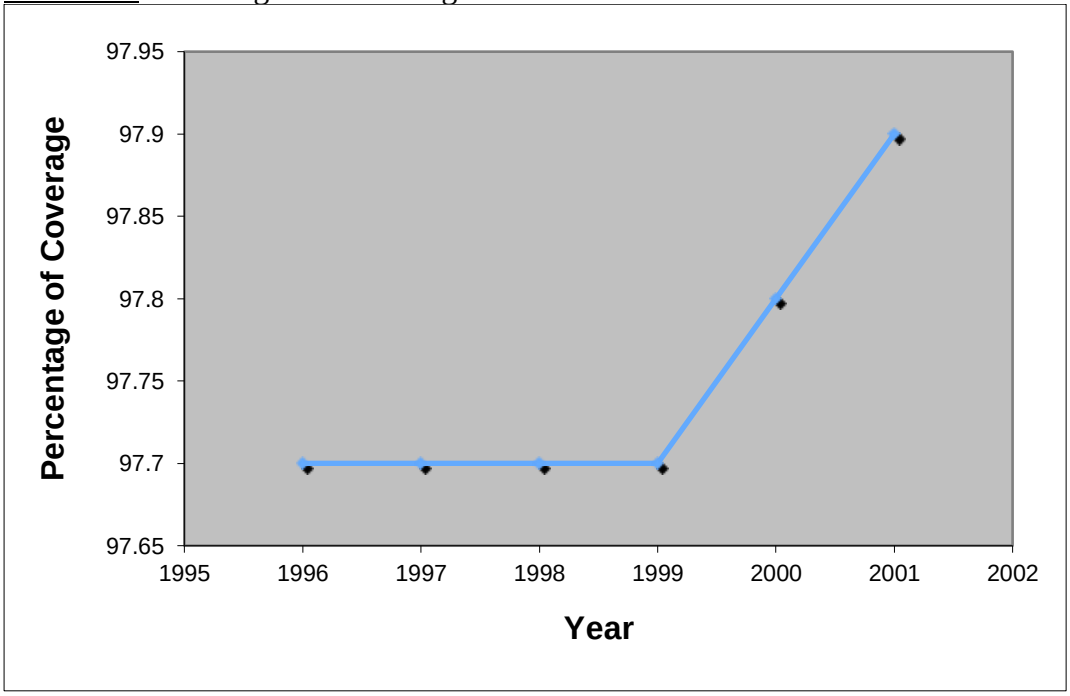
Level of Coverage	Case	Type of Administration	Coverage (%)
High	Limeira	Private	100[a]
	Thames River basin	Private	100
	Athens	Mixed	99
	Aguascalientes	Private	98
	Lahti	Municipal	98
	Niterói	Private	98
	Lakes Region	Private	90
Medium	Kangasala	Municipal	87
	Tucumán	Provincial*	84
	Buenos Aires	Private	79
Low	Cochabamba	Municipal**	57
	Nyeri	Private	38
	Dar es Salaam	Private	33
	Tala	Private	30

* Failed private concession (1995-1997) taken over by the provincial government.
** Failed private concession (1999-2000), taken over by the municipal government.
[a] Not considering irregular settlements.

The table shows that the water utilities with the highest levels of coverage are currently managed by five private companies, one mixed company, and one municipal company. In the top two cases, it is important to highlight that full coverage had already been achieved before the introduction of PSP, which in the cases of the Thames River basin in England took place during the 1960s, on in the case of Limeira, where 97 percent of the population had already been connected before the concession was granted to a private operator in 1995. In the case of Niterói, contrariwise, the private operator that was granted the concession in 1999 extended coverage from 78 per cent to 98 percent by 2002,[18] while in the Lakes Region between the start of the contract in 1998 and 2002 coverage was extended from less that 80 percent up to 90 percent (Vargas, 2003: 90). In the case of Lahti (population 98 thousand) there is a very high percentage of potable water coverage as shown in Chart Nº 6, which grew at the same rate as the population until the period 1999 to 2001, when it increased by 0.2%. When such a high percentage of the population is supplied with water, it is usually very hard to reach 100% because the population without access to water generally lives in isolated homes and solves their potable water supply in other ways, especially in countries like Finland characterized by high living standards and a population scattered in relatively small or medium sized urban centers.

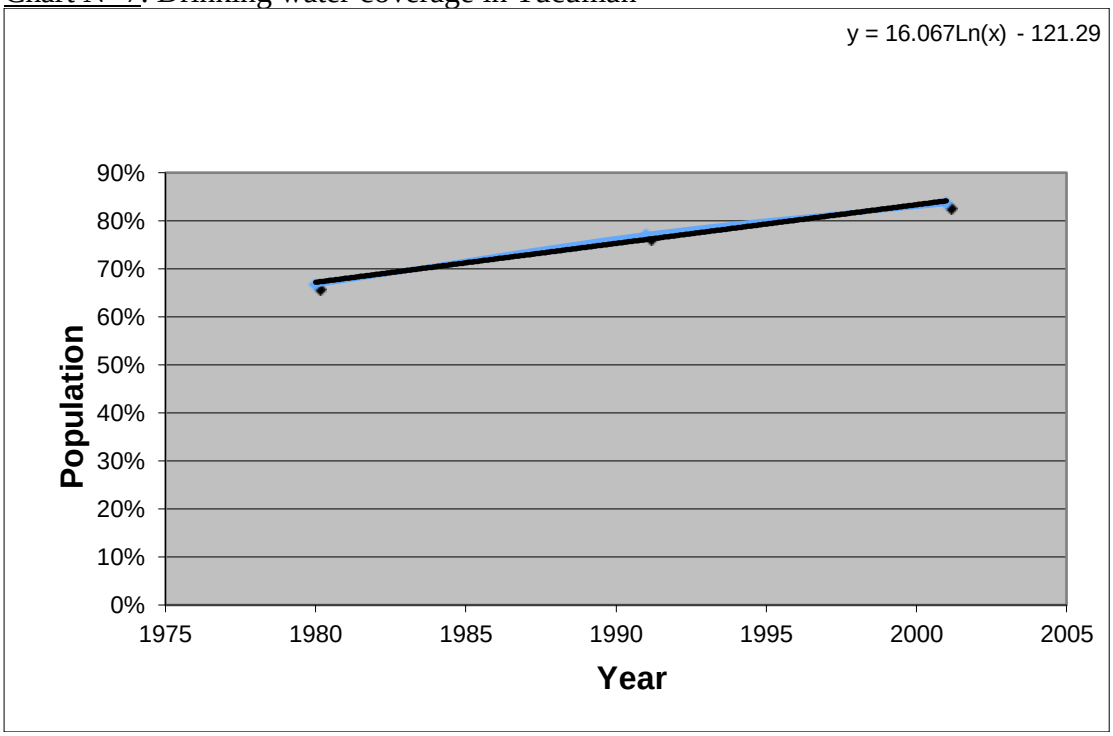
[18] This information was provided informally by the private operator to our Brazilian partner (Vargas, 2003: 134).

Chart Nº 6. Drinking water coverage in Lahti



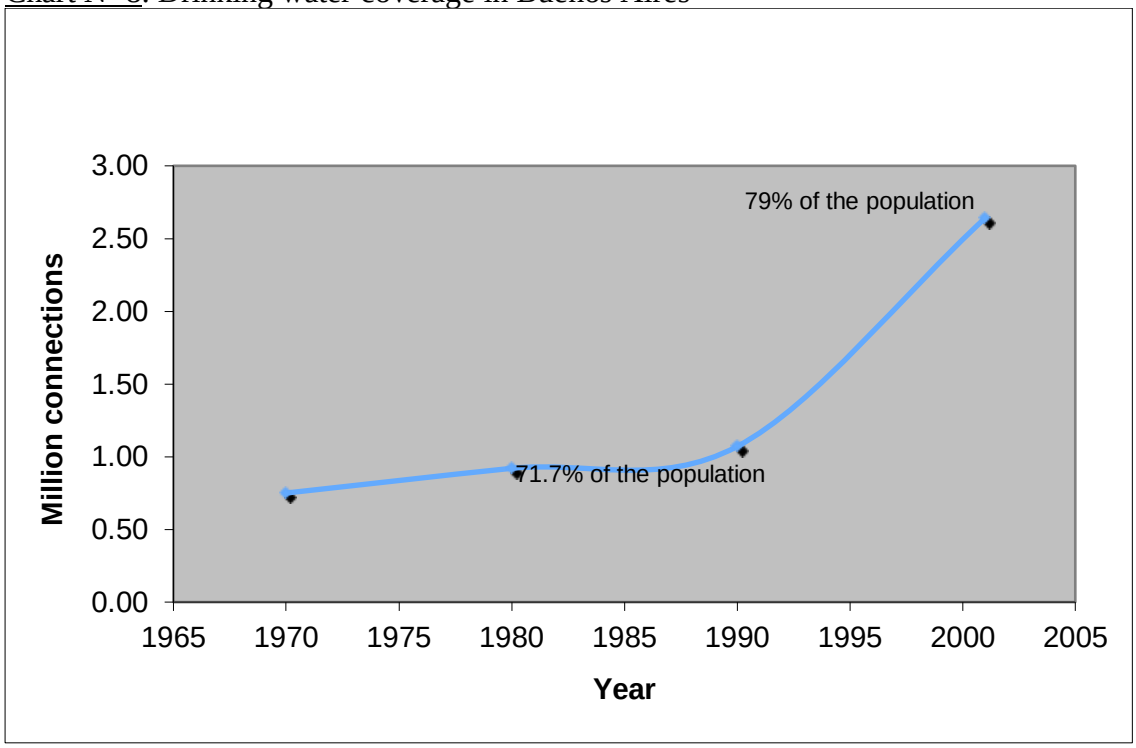
Looking now at the water utilities showing medium levels of coverage, these are administered by one municipal company, one public company, and one private company (that has been running the system for over one decade). For instance, observing the time dimension in the case of Tucumán, where WSS are provided by a provincial public company after a short lived private concession that lasted around two years between 1995 and 1997, coverage for drinking water services increased by 20 percent from 1980 to 2001, indicating that infrastructure projects have been carried out to expand coverage over this long period. The trend indicated by the equation in the upper right corner of Chart Nº 7 establishes that with this rhythm of infrastructural growth, full coverage would be achieved by the year 2020.

Chart Nº 7. Drinking water coverage in Tucumán



In the case of Buenos Aires, as shown in Chart Nº 8 there has been an important increase in coverage during the 1990s after the services were granted in concession in 1993, when the drinking water network was rapidly expanded to cover 79 percent of the population by 2003. However, the regulator ETOSS has recently tightened its monitoring over this private operator because this expansion fell short of the investment commitments agreed in the concession contract, as coverage was supposed to reach 88 percent in the same period (Azpiazu et. al., 2003).

Chart Nº 8. Drinking water coverage in Buenos Aires



Finally, the water utilities with the lowest levels of coverage for drinking water are administered by three private companies and one municipal company. The four cases are located in very poor countries, with extreme levels of deprivation and lack of basic infrastructure. The case of Cochabamba is world famous because of the collapse of the private concession granted in 1999, which for reasons considered in greater detail elsewhere led to widespread social mobilization and the withdrawal of the entire federal cabinet in March 2000 (Crespo et. al., 2003). During the few months that the concession lasted no investments were made. The other three cases are located in Africa, where coverage levels are extremely low. In Nyeri (population 120,540), the concession granted in 1998 stipulated an expected increase in coverage of 56 percent by 2005, and by 2003 the network had been extended by 26 percent. In Tala Town (population 22,375) there were no precise data available, but since the granting of a concession in 1999 there have been some improvements in terms of network expansion and service reliability, but coverage remains extremely low at 30 percent taking into account that the contractual commitment of the private company is to halve the population without water by 2015 (after the MDGs). In the case of Dar es Salaam, the concession was granted only in 2003 and it was not possible to make an assessment of the prospects for improving coverage of drinking supply (currently 33 percent of the population) under the new management.

In this group of cases showing very low coverage levels, the conditions of extreme poverty and social polarization have been worsening in recent years, which make investment in infrastructure unattractive to private operators and often unfeasible for the public sector. As we already noticed in our original project proposal, investment flows involving PSP in the water and sanitation sector that peaked between 1990 and 1997

almost ignored Sub-Saharan Africa and other poor regions of the globe (PRINWASS, 2000), a situation that has worsened since the late 1990s with the sharp decline in investment recorded in the sector and that we have also captured in our case studies (Azpiazu and Schorr, Article 2 in this publication). As bluntly put recently by a global water think tank,

> Can anyone imagine investing hard currency in water projects in countries like the Philippines, Argentina and Bolivia now? The map of the world according to the private water companies has changed a lot since IWL [International Water] was founded in 1996. There are only a dozen or so countries marked on it: China, Malaysia, the United Arab Emirates, Britain, France and Spain are the big ones. If you look closer you might find tiny specks representing the USA, Saudi Arabia, Germany, Italy and Mexico. Africa, South America, south and most of South East Asia have been erased (Global Water Intelligence, 2004).

In perspective, this should not be surprising, and the current situation casts serious doubts of the feasibility of achieving the MDGs in these countries unless radical changes are introduced in the sector policies in order to strengthen public sector capacities, in particular those of local authorities. However, to keep on track our main discussion in this document let us move on now to consider another aspect of the techno-infrastructural dimension related to the control and management of drinking water consumption.

User management technology

In this section we explored if companies have updated their technologies for the management of drinking water consumption. In this regard, in the cases where information was available about improvements in commercial efficiency based on investment in infrastructure (e.g. macro and micro metering) and high technology (e.g. software), there have been significant improvements. For instance, in some developing country cases the private companies have managed to update the user databases, which often were unreliable and incomplete, to cover between 95 and 100 percent of the users. It is clear that prioritizing the updating of the user database has been an essential task for all companies, especially those outsourcing services, since this in turn improves printing statements, payment information, location of expired bills and leads to a more efficient billing service in general. The private companies have invested resources in this stage of water production because a reliable user database directly affects their commercial efficiency in cost-benefit terms.

In this connection, among the case studies covered most companies have made substantial improvements in keeping or updating their consumer databases. In the European cases this has been traditionally done and most cases (Lahti, Kangasala, Thames River basin) reported efficient systems of user identification and billing. In the cases of Brazil (Limeira, Niterói and the Lakes Region), Buenos Aires, and Aguascalientes, the private companies have also made substantial progress in improving user databases. In the last two cases, sophisticated computer systems have been

developed that automatically register high precision micrometers, which greatly facilitates the updating of the users register as well as keeping a meticulous control over consumption and billing of water services. In addition to registering the precise consumption of each home, this system can give an enormous amount of useful information for carrying out expansion strategies, establishing the needs and weaknesses demonstrated by each sector supplied with water, and designing and implementing more precise objectives to improve the conditions of the drinking water system in general. The private operations in the African cases have also reported significant improvements in overall user management, from registration to metering and billing, although they have started from a very low level and the situation remains extremely weak in comparison with the other developing country cases in Latin America.

Nevertheless, the increasing sophistication in user management systems is counterbalanced in some cases by the low proportion of metered connections and by technical, social, and political problems arising from the implementation of these technologies. Table Nº 7 shows the proportion of metered connections for a sample of cases for which this information was available. It is interesting to note than in the case of the Thames River basin –and in fact in the whole England and Wales water industry–, the proportion of metered connections is very low and was even much lower until very recently (around 14 percent in the Thames River basin in the late 1990s). As already commented earlier, the private companies are not in favor of extending metering for a number of reasons, not least because they estimate that extended metering would significantly reduce the volume of billed water as well as expose the actual levels of physical losses, which may be significantly higher than those officially reported.

Table Nº 7. Micro-metering for domestic users in a sample of case studies (%)

Level of metering	Case	Type of Administration	Percentage of metered domestic connections
High	Limeira	Private	100
	Niterói	Private	100
	Lakes Region	Private	96.4
	Nyeri	Private	81
	Cochabamba	Municipal*	76.6
Low	Thames River basin	Private	28
	Buenos Aires	Private	22
	Tala	Private	11

* Failed private concession (1999-2000), taken over by the municipal government.

Moreover, as previously indicated there has been a clear imbalance between the efforts made to improve the commercial efficiency of the companies, where the emphasis

has been placed, and enhancing the overall efficiency of the system including consumer satisfaction. Despite frequent references by the private companies to high levels of consumer satisfaction, there have been increasing conflicts deriving from the widespread dissatisfaction caused by the rising efficiency in billing and fee collection –accompanied by steep increases in water fees– which are often not matched with higher service quality. For instance, in Buenos Aires the regulator ETOSS and the Ombudsman have had to intervene very frequently owing to rising users protests, and have detected important problems in the implementation of the new user management technologies. These include errors in registration and billing, meters which overestimate consumption, unjustified payment orders, and similar problems, which have led to the repeated application of fines and other sanctions by the authorities and have even reached the Supreme Court of Justice. In Aguascalientes, problems have arisen because the poor condition of the distribution network causes that the pipes carry a mixture of water and air, which means that air is counted by the meters and is charged for in the water bills. This has affected in particular the poorest sectors of the population, who live in areas of the city where the condition of the network is very poor and the water pressure is very low, and for whom the water bill represents a very high proportion of their household income. Thus, a survey carried recently by the municipality found that despite of the high level of coverage (98 percent), and that there is an overall good evaluation of the service (7.4 points out of 10), one third of the users complained that their drinking water supply was intermittent and unreliable while invoicing and fee collection were carried out by the private operator with disregard for these basic quality problems.

In the case of Niterói, the private concessionaire decided to implement full metering, including for households in slums, in a doubled-edged strategy to improve commercial and operational performance and, to a lesser extent, induce a customer culture of paying for water especially among the poor. However, this is having a huge impact on the poor because the cost of the water meter plus the connection fee, both of which have to be footed by the user, represent a real burden for low-income families as it takes one full minimum wage to pay for these items. In the two Kenyan cases, although there is recognition that the service has been improved the increasing bills resulting from introducing PSP and enhancing billing and fee collection have also raised widespread dissatisfaction because there is a perception that private profit is receiving priority vis a vis community needs in a context of widespread poverty and deprivation. In Tala, for instance, 80 percent of the people continue to obtain water from other sources, buying from alternative providers or through illegal tapping. Similar problems have been identified in most cases, and resistance to the negative impact of user management technologies, whether through non-payment of water bills or outright destruction of infrastructure (particularly water meters) has played an important part in the conflicts arising from the expansion of PSP in the water and sanitation sector. We discuss this in more detail elsewhere in relation to the socio-political and cultural dimension characterizing the expansion of PSP in the provision of water and sanitation services (Castro, Article 1 in this publication).

Drainage stage

Drainage is the first phase within the overall cycle involving the safe collection, conveyance, treatment and disposal of wastewater to protect public health and the ecological sustainability of the natural system. We consider here the collection and conveyance of wastewater, and will treat the question of treatment and disposal in a separate section. Assessing efficiency in this stage of the cycle involves analyzing service coverage, the type of drainage system, as well as the size of the network and the system's performance. This last point involves considerations of the type of conveyance (by gravity or pumping), as well as maintenance to avoid sedimentation in pipes, among other factors.

Whenever possible, best practice recommends that the collection and conveyance of wastewater and rainwater should be solved separately, although in most cases sewage and rainwater are collected and transported by a single system owing to a diversity of factors, which causes severe problems for treating wastewater. For instance, in some climates the quality of wastewater tends to have high seasonal variations because the concentration of pollutants changes from the rainy season to the dry season, affecting the treatment process needed to maintain relatively stable parameters of pollutants. Historically, joint drainage systems were designed to avoid flooding in cities and to avoid the spread of infectious diseases, but the growth of this kind of network has often been circumstantial and unplanned, which has been compounded by urban expansion and the need for further extensions of the original network.

In recent years there has been a revival of interest in rainwater collection and management, which was an important feature in past generations but was largely abandoned in most countries with the development of modern water supply and sewerage systems especially since the nineteenth century. However, in the face of growing water demand and declining water resources in many areas, rainwater collection is receiving again consideration as, unlike untreated wastewater, rainwater can be stored or filtered to the subsoil to increase recharge in aquifers. In addition, rainwater is not harmful and has many uses with no need for treatment. Conversely, joint systems combine rainwater with wastewater which increases the volumes to be conveyed and treated, causing, among other things sewer overflowing and the need for larger treatment plants and unnecessary expenses. Table Nº 8 shows the type of drainage systems found in the cases studies.

Table Nº 8. Types of drainage system in the case studies

Case Studies	Type of Administration	Type of Drainage
Aguascalientes (Mexico)	Private	Joint
Athens (Greece)	Mixed	Dual
Buenos Aires (Argentina)	Private	Dual
Cochabamba (Bolivia)	Municipal*	N/a
Dar Es Salaam (Tanzania)	Private	N/a
Kangasala (Finland)	Municipal	Dual
Lahti (Finland)	Municipal	Dual
Limeira (Brazil)	Private	N/a
Niterói (Brazil)	Private	N/a
Nyeri (Kenya)	Private	N/a
Tala (Kenya)	Private	No system
Thames River basin (UK)	Private	Joint***
Tucumán (Argentina)	Public (provincial)**	Dual

* Failed private concession (1999-2000), taken over by the municipal government.
** Failed private concession (1995-1997) taken over by the provincial government.
*** Dual systems operate in parts of the basin.

As can be observed in the cases where information was available, some cities do have separate systems for rain and wastewater, but in most cases –although we could not have access to precise information– there is a single system for rainwater and wastewater for the reasons mentioned above. Even where there is a dual system, it only covers specific parts of the city, such as low areas near a body of water. None of the cases of concession to private companies mention building a dual drainage system as a requirement or a commitment to improve infrastructure.

The levels of coverage for the sewerage networks allow us to obtain a measure of the systems' efficiency.[19] As shown in Table Nº 9 London,[20] Limeira,[21] Aguascalientes,

[19] Although these data do not show maintenance of the drainage network, complexity of systems or other factors to establish how drainage systems work in cities, they provide an important piece of information that allows us to estimate the level of access to this service by the population. At the same time, this information gives some hints about the level of techno-infrastructural improvement being achieved.

[20] In the same way as drinking water, this level of coverage was achieved in London long before the company was privatized in 1989.

[21] In Limeira, 95 percent of the population was already connected to the sewerage network by 1994, before the concession was granted to a private operator.

and Lahti are the locations with the highest percentage of the population connected to the sewerage network. However, these figures must be read with caution given that the definition of what exactly is involved in the provision of drainage may be different in these countries and we have not been able to ascertain what the similarities and differences might be between these cases.[22] Again, the provision of drainage is very low (Dar es Salaam and Nyeri) or non-existent (Tala) in the African cities. Overall, and keeping in mind that the meaning of these figures is not straightforward, the average coverage level for the thirteen cases considered here is 63 percent.

Table Nº 9. Coverage level for drainage systems in the case studies

Case Studies	Number of residents	Type of Administration	Coverage (%)
Limeira (Brazil)	249,246	Private	100 [a]
Thames River basin (UK)	13,209,100	Private	100
Aguascalientes (México)	594,092	Private	97
Lahti (Finland)	95,000	Municipal	97
Athens (Greece)	3,120,000	Mixed	92
Kangasala (Finland)	19,700	Municipal	83
Niterói (Brazil)	458,465	Private	75
Buenos Aires (Argentina)	9,112,598	Private	63
Cochabamba (Bolivia)	778,000	Municipal*	54
Tucumán (Argentina)	1,333,416	Public (provincial)*	36.7
Nyeri (Kenya)	120,000	Private	13.4
Dar Es Salaam (Tanzania)	2,500,000	Private	10
Tala (Kenya)	22,375	Private	0
		Average	**63**

* Failed private concession (1999-2000), taken over by the municipal government.
** Failed private concession (1995-1997) taken over by the provincial government.
[a] Not considering irregular settlements.

If we compare the levels of coverage for drinking water (Table Nº 6) with the levels of coverage for drainage presented in Table Nº 9 we can see that in general there is a significant difference between the levels of water supply coverage and coverage for

[22] In the case of Mexico, for example, "drainage coverage" is understood as the percent of the population whose homes have a drain connected to the public drainage network, a septic tank, a river, lake, ocean, ravine or crevice.

wastewater collection, treatment and safe disposal, where the latter is substantially lower.[23] This deficit indicates the existence of vulnerable areas from a public health perspective, even in the developed country cases, which is confirmed when we look at the socio-spatial distribution of both the access to these services and the combined impact of the lack of access to safe WSS, socio-economic inequality, and poverty.[24] This is another crucial aspect involved in the MDGs, which aim at also reducing by half the world population without access to adequate sanitation. In this sense, the situation is even more challenging than for water supply, giving the very high investments needed to expand un upkeep the sewerage systems, the increasing recognition that the private sector will not play an important role in funding these programmes, and the fact that the public sector in the countries where the need is highest are also unable to provide the funding needed. Nevertheless, from our cases we have some hints about what level of progress has been made and could be expected in this area, although the information has been also very scant in this area. Charts Nº 9 to 11 present a brief analysis of the evolution of drainage coverage in some cases for which information was available.

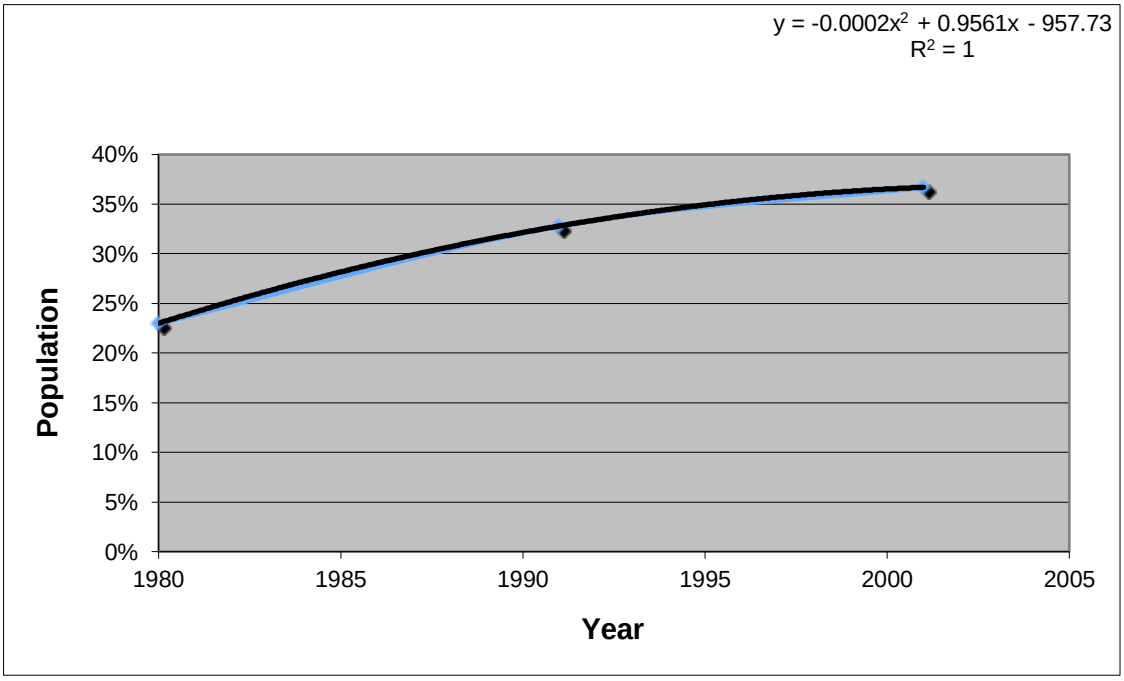
As shown in Chart Nº 9, over the last two decades there was significant progress in expanding drainage coverage in the case of Tucumán between 1980 and 1991, and although there was continued expansion the pace slowed down between 1991 and 2001,[25] not least because of the problems created by the failed concession of the utility to a private operator (1995-1997).

[23] From another angle, and regarding the techno-infrastructural dimension, the deficit can be solved with alternative methods such as septic tanks, which should meet hygienic norms to avoid pollution of nearby bodies of water on the surface or underground.

[24] See Crenzel and Forte (Article 4 in this publication) for a consideration of the socio-spatial aspects of the distribution of WSS in PRINWASS' case studies.

[25] The equation in the upper corner of Chart 9 shows that over time the rate of drainage coverage decreases.

Chart Nº 9. Drainage coverage in Tucumán

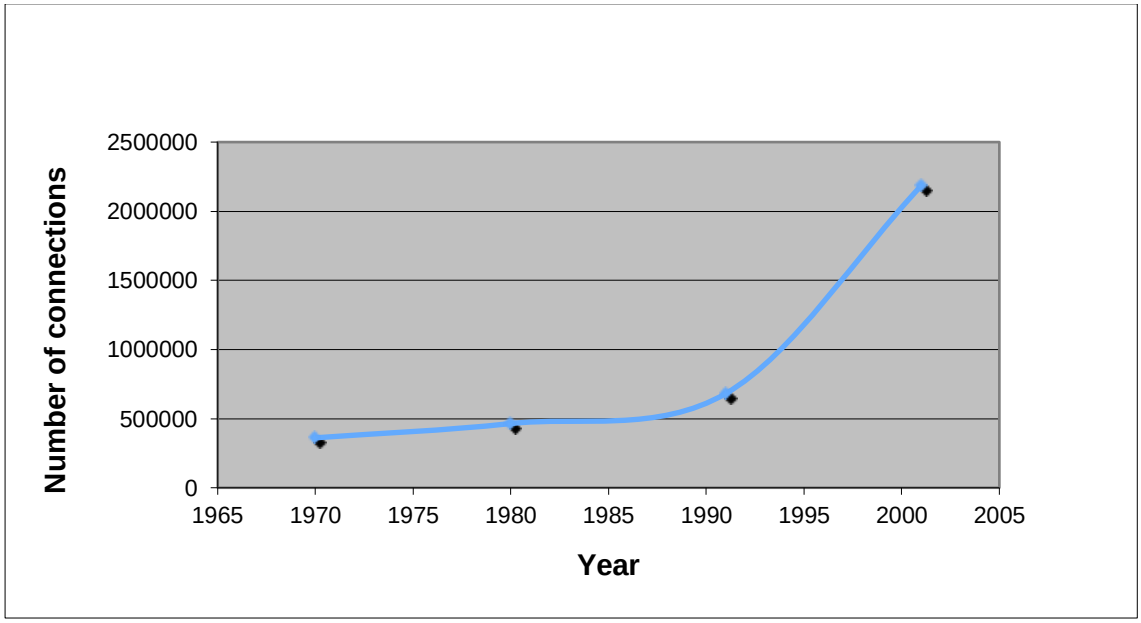


Not only there was no investment during the short-lived concession, but after the mutual cancellation of the contract by the private operator and the provincial government the first resorted to file a suit against the federal government of Argentina before the International Centre for Settlement of Investment Disputes (ICSID) asking for a compensation of 300 million dollars in concept of lost revenues and other items. This case illustrates a very relevant aspect of the impact that PSP may have on the possibilities of developing countries to achieve the MDGs, whereby rather than supporting the country's chances of success in achieving the goals the process can take the opposite direction and contribute to worsening conditions. A not so dissimilar situation took place in Cochabamba in the year 2000, and the current conflict between the private operator AASA and the government of Argentina over the Buenos Aires concession is another crucial case in point.[26]

In this regard, for the case of Buenos Aires we did not obtain data to check the evolution of the coverage in percentages over the years, but we have data showing changes in the absolute number of sewerage connections that increased from 52.6 percent in 1991 to 63 percent in 2003, as showed in Chart Nº 10.

[26] See Crespo et. al. (2004) for the Cochabamba case, and Azpiazu et. al. (2003), for Buenos Aires.

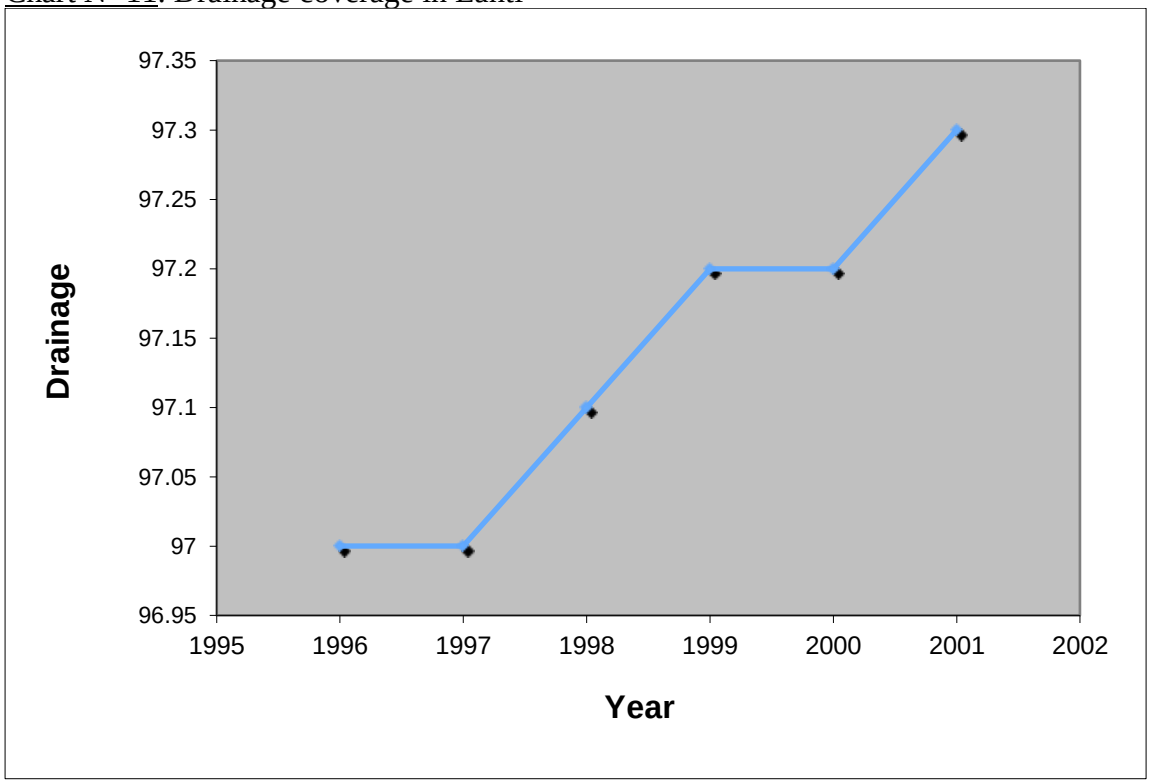
Chart Nº 10. Drainage connections in Buenos Aires



As the chart shows, coverage increased by practically 10 percent over 10 years, which took place after the utility was granted in concession to the private operator AASA. However, although this is an important improvement, according to the regulator ETOSS the company has repeatedly breached the contract commitments in relation to the Service Enhancement and Expansion Programme (PMES), which included the completion of a main sewerage trunk and the expansion of the network coverage. This and other breaches of contract have resulted in a significant deficit of over one million people that should have been connected by 2003 but have not (the target agreed was 74 percent of the population and the actual figure achieved was 63 percent) (Azpiazu et. al., 2003).

In the case of Lahti, as shown in Chart Nº 11, the percentage of coverage did not change much during the 1990s, since it was already very high with 97 percent of the population covered. In any case, coverage has gradually increased, although the remaining 3 percent of the population without access to networked drainage has alternative systems for wastewater collection.

Chart Nº 11. Drainage coverage in Lahti



In London, although there is universal coverage for sewerage, the lack of renewal of the ageing networks has been worsening in recent years causing severe environmental problems and public health concerns, especially because of the recurrent events of sewer flooding affecting important parts of the city. According to the Environment Agency, the environmental regulator in England and Wales, the private operator providing sewerage services in the Thames River basin is one of the worst performers in the country, and has received high fines for breaching the regulations for permitted levels of pollutants during the last consecutive five years, a situation which the regulator recently has evaluated as worsening. The private operator faces mounting problems given the ageing infrastructure, most of which is over 100 years old, and the high cost of renewal because it requires disrupting central parts of the British metropolis. In addition, the process of deindustrialization experienced by London since the 1970s has led to a steep reduction in abstractions from the underground aquifer below the city, which has caused a rapid rise of the water tables and the recurrent flooding of the many underground buildings and urban infrastructures like the London Underground and the basement of buildings in different parts of the city. This situation has prompted the creation of an ad hoc body to tackle the problem of rising water tables, which at the moment is being solved through the daily pumping of around 40 million liters to avoid damage to the urban infrastructure. Despite the urgent need for investment in infrastructure renewal, in the last price review announced in August 2004 by the economic regulator OFWAT, important plans to build

a main sewerage trunk have been postponed owing to the political unfeasibility of raising the water bills to collect the funds needed (Castro, 2003).

Overall, this section shows that over the last two decades there has been overall progress in the expansion of drainage systems in most cases, whether public or privately managed. However, there are two main aspects worth highlighting here. Firstly, progress has been much slower in drainage systems than with drinking water although the deficits are also much higher for drainage. This is very important from the perspective of achieving the MDGs, given the increasing evidence that private funds will not be available as often claimed in mainstream WSS policies, and the public sector of most countries with the highest needs is not in a position to fund the large-scale works needed to achieve the targets. Secondly, the collection and conveyance system is only the first phase of the stage leading to the safe disposal of wastewater back into the aquatic environment, which has to be completed through the treatment and final disposal stage, to which we turn next.

Sanitation and treatment stage

In order to achieve sustainability polluted water must be returned to the aquatic environment in conditions that allow the natural self purification of water over a reasonable period of time.[27] Ideally, as water passes through the different phases of the production cycle and tends to lose considerable volumes between intake at source and its arrival at the wastewater treatment facilities, we should be able to establish quality controls during the different stages in an integrated manner. However, this type of holistic quality management of the water cycle is still far from been achieved. In many countries, the level of wastewater treatment needed is decided according to the concentration of pollutants and the speed at which these pollutants dissolve without affecting permissible limits. In other cases, the standard is set to meet the needs of the particular uses to be given to the recycled wastewater, whether it is for agriculture, industry or human consumption, each of which has different parameters to determine the maximum level of pollutants to be allowed.

In this connection, the information gathered in the case studies shows that in general current processes for the removal of pollutants do not fulfill the expected standards, since treatment plants do not operate adequately. This is a well known problem in developing countries where, because of lack of resources, the treatment plants are operated inefficiently or the plants are not large enough to accommodate the volumes of water to be treated. This is the case, for instance, in Cochabamba, Bolivia, where in one primary treatment plant the retention period (the time needed for the self purification of water up to certain parameters) has been shortened in order to treat a larger volume of water. Table Nº 10 shows the percentage of wastewater treated and the type of treatment applied in the case studies.

[27] Norms setting maximum permissible limits of pollutants in wastewater are not always comparable across different countries, and enforcement is still very weak, especially in developing countries. The European Water Framework Directive has established new international standards, but it is still in its early stages of implementation and even in Europe the application of these standards is facing substantial challenges.

Table Nº 10. Water treatment in the case studies

Case Studies	Type of administration	Water treated (%)	Type of treatment
Kangasala (Finland)	Municipal	100	n/a
Lahti (Finland)	Municipal	100	Secondary
Thames River basin (UK)	Private	100	n/a
Aguascalientes (Mexico)	Private	84	n/a
Limeira (Brazil)	Private	45.5	n/a
Niterói (Brazil)	Private	43.7	Primary
Cochabamba (Bolivia)	Municipal*	30[a]	Primary
Tala (Kenya)	Private	0	No treatment
Nyeri (Kenya)	Private	0	No treatment
Buenos Aires (Argentina)	Private	0	No treatment
Dar Es Salaam (Tanzania)	Private	n/a	Primary
Athens (Greece)	Mixed	100	Primary
Tucumán (Argentina)	Public (provincial)**	n/a	Primary

* Failed private concession (1999-2000), taken over by the municipal government.
** Failed private concession (1995-1997) taken over by the provincial government.
[a] Calculation based on information in the case study. The treatment plant serves 175,000 people and does not function adequately.

As indicated in the table, Kangasala, Lahti, London, and Athens treat 100 percent of their wastewater, Aguascalientes treats 84 percent,[28] Limeira, Niterói and Cochabamba treat less than 50 percent, while Tala and Nyeri discharge their water with no treatment whatsoever. In the case of Buenos Aires, the information regarding the actual level of wastewater treatment is unclear, but according to the regulator ETOSS the private operator has breached the contract commitments for investment in wastewater treatment facilities, including the failure to build a primary treatment plant that was part of the concessions' Service Enhancement and Expansion Programme (PMES). The regulator has fined the private operator in several occasions for the lack of compliance in this area, and the belated investments are part of the ongoing negotiations between the company and the federal government in relation to the future of this concession (Azpiazu et. al., 2003).

Regarding the type of treatment applied in our different case studies, we know that in Cochabamba, as observed above, primary treatment is applied with a lower retention time, while in Tucumán where there is also primary treatment, wastewater is released into the environment with a higher BOD than permitted by the relevant standards

[28] Treatment of wastewater in Aguascalientes is no longer the responsibility of the private operator CAASA, but is done by the municipal government and some private concessionaires.

applying in Argentina. In Lahti 100 percent of wastewater receives secondary treatment, and in Athens 100 percent of wastewater receives primary treatment but a secondary treatment plant is under construction. In the Thames River basin –and in England and Wales at large– 100 percent of wastewater is treated, although there is a persistent problem of pollution caused by pesticides and other chemicals leached into the sewerage system from agricultural runoff, rainwater, and also domestic wastewater. In Dar es Salaam and the Lakes Region primary treatment is applied, while in Niterói 92 percent of wastewater receives primary treatment, 7 percent receives tertiary treatment, and 1 percent receives secondary treatment. Kangasala is unspecified.

This stage of the cycle is certainly one of the most problematic in all cases, including developed countries, owing to the significant costs involved in the adequate treatment of wastewater. Although a diverse range of the technologies exists, and that developing countries like Brazil have their own technological development in this field, in many cases the costs of installation and maintenance are prohibitive, in particular for the poorer regions.

We have completed now the revision of the different stages of the process, according to the available information gathered from the case studies, and will proceed to analysis of the aggregated indicators.

The aggregated indicators

In the preceding sections we have examined diverse parameters such as efficiency of the systems for abstraction, conveyance and treatment of raw water, distribution of drinking water, user management technologies, and collection, treatment and disposal of wastewater. A final exercise is to compare the different water utilities in order to identify any trends that may clearly relate efficiency in the techno-infrastructural dimension with the type of operator, public or private, in order to contribute to answering the original research questions of the project. To this effect, Table Nº 11 shows first the different water utilities studied in the project listed by type of operator and period of time that the operator has been in charge of the facilities

Table Nº 11. Type of operator and period in charge of the WSS

Country	City/Region	Type of operator	Start date	Time in operation
Finland	Lapua, Nurmo, Kuortane, and Kauhava	Municipal	1972	32 years
Finland	Kangasala	Municipal	1950s	Over 50 years
Finland	Lahti	Municipal	-	Over 30 years
Bolivia	Cochabamba	Municipal*	1999	Less than 1 year
Argentina	Tucumán	Public (provincial)**	1995	2 years – cancelled in 1997
UK	Thames River basin	Private	1989	15 years
Mexico	Aguascalientes	Private	1993	11 years
Argentina	Buenos Aires	Private	1993	11 years
Brazil	Limeira	Private	1995	9 years
Brazil	Lakes Region	Private	1998	6 years
Kenya	Nyeri	Private	1998	6 years
Kenya	Tala	Private	1999	5 years
Brazil	Niterói	Private	1999	5 years
Greece	Athens	Mixed	1999	5 years
Tanzania	Dar es Salaam	Private	2003	1 year

* Failed private concession (1999-2000), taken over by the municipal government.
** Failed private concession (1995-1997) taken over by the provincial government.

The table shows that most private operators have been in charge for a relatively short period of time, with exception of the companies serving the Thames River basin, Aguascalientes, Buenos Aires, and Limeira. The oldest operators are the Finnish municipalities. Taking into account that the processes involved in the provision of WSS to whole populations is a long-term venture, particularly from the perspective of developing, upkeeping and renewing technology and infrastructure, PSP does not have a very long record of service. All the cases of PSP considered here have been the result of the implementation of the mainstream WSS policies that have been promoted since the 1980s worldwide, and most have been in charge for 6 years or less. In two cases (Tucumán and Cochabamba) the private concession collapsed and the services had to be resumed by the public sector, while in Aguascalientes the private operator had to be rescued from financial collapse by the public sector only 1 year into the concession, after which the responsibility of the private operator for the system's infrastructure was greatly reduced or altogether taken back by the public sector (in the case of wastewater infrastructure). Not so dissimilar processes have taken place in the Thames River basin and in Buenos Aires, where the failure of the private operators to comply with the contractual commitments regarding infrastructure renewal or expansion have been a hallmark of the respective cases.

Therefore, the information presented in Table Nº 12 below has to be interpreted with caution, because it shows a static picture that needs to be complemented with the

analysis of the other dimensions covered in the study, in particular the economic-financial, legal-institutional, and socio-political and cultural (Azpiazu and Schorr, Vargas and Seppälä, and Castro, Articles 2, 3 and 1in this publication). The fact that a company is presented in the table as "public", "mixed", or "private" only reflects their current status in terms of ownership or management regime, but it does not tell us if the processes underlying the efficiency scores assigned in the table were the result of public or private efforts or failures. Only in the case of the Finnish municipalities Lahti and Kangasala the scores can be clearly related to the type of operator, given that they have been running the services for several decades as public entities. In other cases, as already discussed in the previous sections, the successes and failures now represented in the high or low efficiency scores are the result of a complex interweaving of factors whereby it is difficult to disentangle public from private responsibilities. However, taking into account the original arguments put forward to promote PSP in the sector, in particular the claim that it would enhance efficiency in infrastructure, the table offers a useful synchronic synthesis of the state of the systems that complements the diachronic analysis presented in previous pages and in the other project reports. With these warnings in mind, we can now consider the scores for average efficiency resulting from the analysis of the six indicators collected from the case studies presented in Table Nº 12.[29]

Table Nº 12. Level of final efficiency according to type of operator

Case Study	Type of administration	Average efficiency
Lahti	Public	2.67
Thames River basin	Private	2.50[30]
Athens	Mixed	2.50
Limeira	Private	2.33
Kangasala	Public	2.33
Aguascalientes	Private	2.17
Buenos Aires	Private	2.00
Tucumán	Public*	1.80
Niterói	Private	1.80
Nyeri	Private	1.75
Tala	Private	1.33
Dar es Salaam	Private	1.20
Cochabamba	Public**	1.00

* Failed private concession (1995-1997) taken over by the provincial government.

** Failed private concession (1999-2000), taken over by the municipal government.

[29] See Appendix for a more detailed account of the indicators for each phase.

[30] This high score for RWE-Thames Water is controversial, but we have used here the available official information about the operator's performance provided by the economic regulator OFWAT. From additional information gathered from the case study, including recent reports from the regulators, it seems that the actual efficiency level of the company is much lower.

The table suggests that the most efficient systems among our case studies are those serving Lahti, with an autonomous municipal operator, the Thames River basin with a private operator (but see Footnote Nº 30), and Athens, a public operator that recently floated 39 percent of its shares in the financial market to incorporate PSP. The hierarchy of cases below shows that both private and public operators tend to have regular or poor infrastructure efficiency, which is a significant piece of information. That many public-sector utilities in the developing world, especially in very poor countries, tend to have very low efficiency levels is a well established fact.[31] However, what this Table shows is that one of the key arguments used to promote PSP in the water and sanitation sector since the 1980s, that it would help to enhance the efficiency of infrastructure, cannot be substantiated with evidence. When we consider the infrastructure efficiency for all the stages involved in the cycle of producing water for human consumption, from raw water intake to safe disposal of wastewater, the top performing operators tend to be public entities, which is reinforced by the fact that several indicators that allow some of the private companies to score high efficiency levels in Table Nº 12 were actually achieved under public sector ownership and management, as in the cases of the Thames River basin[32] and Limeira.[33]

In fact, the evidence suggests that private operators have not managed to reach and maintain top performance levels even after 15 years of operation, as observed in the case of RWE-Thames Water. In Buenos Aires, after 11 years of operation and despite important achievements performance levels have been well behind the targets agreed in the concession contract and, even after several contract renegotiations that reduced the original investment commitments of the private company, the revised targets have not been accomplished either. In other cases like Nyeri, deficient structural conditions in place when private administration began operating have not been reverted after six years. Tucumán and Cochabamba are perhaps among the best examples of the very negative impact that PSP might have in developing countries, as not only the private operators did not bring in fresh investment to renew and expand infrastructure, but are trying to make the respective countries pay a compensation for lost profits and expenses derived from

[31] However, the also well established fact that many public operators in both developing and developed countries have top levels of infrastructure efficiency has been largely ignored or neglected in the literature promoting PSP in the water and sanitation sector. And yet, in Brazil and Mexico –to take countries covered by PRINWASS–, after around 10 years of PSP experience in the WSS sector, the best performing utilities are public: SABESP (the state water utility of Sao Paulo) and DMAE (the municipal water company of Porto Alegre, in Rio Grande do Sul), among others in Brazil, and the state water company of Nuevo León SADM in the case of Mexico.

[32] For instance, as already discussed, full coverage for drinking water and sewerage connections in England and Wales, and particularly in the Thames River basin, was achieved several decades ago under public sector management.

[33] In Limeira, after a review of irregularities in the concession contract started in 1995 it was found that the original targets set for the private operator (expanding coverage up to 95 and 80 percent of the population for drinking water and sewerage respectively) had already been widely surpassed under public management: by 1994 coverage levels were already 97 percent for drinking water and 95 percent for sewerage (Vargas, 2003: 32).

the collapse of the concessions,[34] which if granted by the relevant international tribunal (ICSID) would further aggravate the already difficult situation facing these two countries as a result of their recurrent financial and political crises.

Nevertheless, the reader should not jump to any precipitated conclusions on the basis of the analysis presented in this document. In particular, it is clear that comparing small municipal water utilities from a country with such high technological standards and wealth as those characterizing Finnish cities with the water utilities serving very large world metropolises like London, Buenos Aires and Athens, or with the small companies serving towns in Sub-Saharan Africa requires caution and detachment in the analysis. Moreover, additional factors that cannot be adequately considered here, such as the geographical characteristics of the cases or the structural problems affecting the regions where they are located may be more important than the type of administration of water systems in explaining the observed levels of infrastructure efficiency. Lastly, we would like to emphasize that all case studies reported difficulties for obtaining reliable information on basic aspects such as withdrawal, distribution, and consumption of water, investment in infrastructure and technology, and other crucial issues. In many cases, essential information such as the contractual commitments regarding investment in infrastructure are not available for consultation, and in some case not even the regulators have access to this documentation, having to rely on digested information released by the private operators. This is a serious problem affecting the possibility of any rigorous assessment of policy in the sector, and has significant consequences for the effective governance of WSS, as discussed in other project reports.

Conclusions

The evidence reviewed in this study shows that even in the most advanced countries there are significant gaps in the techno-infrastructural efficiency levels in most stages of the cycle of water produced for human use. In developing countries, in particular the African cases, the deficiencies reach extreme levels, but paramount differences can be observed between and within countries in terms of infrastructure efficiency. Throughout the report we have observed how difficult it is for operators, whether private, municipal, provincial, or mixed public-private entities, to revert structural tendencies and give substantial follow-up to investment in infrastructure renewal, maintenance, and expansion. Providing universal access to essential drinking water and sanitation services while preserving hydrological and ecological sustainability has not been yet fully achieved in developed countries, and the very slow pace in the road towards meeting the MDGs suggests that it will be extremely difficult to make progress in that direction in much of the developing world under the currently prevailing policy arrangements.

[34] In the case of Cochabamba, the private operator was actually a "ghost" company based in the Cayman Islands with a capital of US$ 2,000, when it was granted in concession a municipal company with assets worth US$ 100 million. In both cases, after the collapse of the concessions, the private operators are suing the respective governments in concept of "lost profits" and other items for US$ 300 million and US$ 30 million, respectively for Tucumán and Cochabamba.

Despite the claims made in the specialized literature promoting PSP as the best option to enhance efficiency in the WSS infrastructure, the evidence suggests that private utilities tend to perform as poorly as public entities in most stages of the process, such as in controlling physical water losses. Thus, although one of the reasons often given for introducing PSP is the need for huge investments in renewing obsolete infrastructures built but ill maintained by the public sector, in fact private companies have systematically failed to comply with contractual commitments in this area and tend to concentrate their investments in improving the commercial aspects of the business. In this regard, private companies have substantially improved in certain cases the user management technologies and infrastructure, in particular commercial aspects such as billing and fee collection, and also expanding coverage to include new customers. However, private companies tend to have more deficient indicators for sanitation services (sewers and drainage), which continues to be neglected showing very low coverage levels, and poor infrastructure efficiency in the conveyance, treatment, and safe disposal of wastewater. These conditions are aggravated by the lack of investment and innovation in alternatives less costly than conventional treatment plants, which would be more suitable for expanding services to the poor but that seem to be less attractive for private operators.

Evidently, as discussed in the comparative study covering the economic-financial aspects (Azpiazu and Schorr, Article 2 in this publication), one of the key problems is the availability of funding for much needed infrastructure investment. In this regard, and against the expectations raised by the original claims about the need for PSP in the water and sanitation sector, private companies have been reluctant to invest their own capital. This has not just been the case in the examples already mentioned of Cochabamba and Tucumán, but it is rather the pattern characterizing PSP in the provision of water and sanitation. For instance, in the case of Buenos Aires, the amount of own capital supplied by the multinational consortium between the start of the concession in 1993 and 2001 was equivalent to 2.6 percent of total funding available to company. In the cases of the Thames River basin data available for 1999-2003 show that the private operator did not invest any of its own capital. In these and other cases the analysis shows that the bulk of funding has come for tariff revenues, debt, and public funds (Azpiazu and Schorr, Article 2 in this publication). Consistently, representatives of multinational private water operators that attended our final project workshop confirmed that their companies will not be investing their own capital in developing countries and therefore will not play a direct role in contributing to the achievement of MDGs.[35]

Nevertheless, even when funding is readily available, as it is often the case,[36] improvements may not take place because the prevailing governance structure is not oriented towards prioritizing the values embodied, for instance, in the UN declarations regarding the MDGS. As discussed in the comparative study on the socio-political and cultural dimension, governance has to do with decisions about the ends and values that

[35] For details of the discussions and main conclusions of the workshop, see http://www.prinwass.org/documents.shtml.

[36] As seen earlier, even in developing countries important developments have been taking place in terms of infrastructure efficiency improvements and service expansion, to the point that the best performing WSS utilities in many countries are public.

societies want to pursue as well as the means by which these ends and values must be achieved.

Unfortunately, in the mainstream WSS policies implemented since the 1980s market values and the prioritization of private capital accumulation over social and community development, have been paramount. Society, in this model, has to guarantee the conditions that allow private operators to remain profitable, when the type of commitment embodied in the MDGs requires a very different hierarchy of values as well as the search for different means for achieving the expected results. In this regard, any solution to the present and future dilemmas in the field of techno-infrastructural inefficiency in the WSS sector would require original solutions that draw on the wealth of knowledge and possibilities currently available.

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Appendix

Table A-1. Case study cities by population size

City	Population
Buenos Aires, Argentina (2001)	11,453,725
London, England (2001)	7,188,000
Athens, Greece (2001)	3,187.734
Dar es Salaam, Tanzania (1999)	2,497,940
Tucumán, Argentina (2001)	697,936
Aguascalientes, Mexico (2000)	643,419
Cochabamba, Bolivia (2001)	517,024
Niterói, Brazil (2000)	459,451
Lakes Region,[37] Brazil (2000)	403, 418
Resistencia, Chaco, Argentina (2001)	365,637
Limeira, Brazil (2000)	249,046
Nyeri, Kenya (2001)	120,540
Lahti, Finland (2003)	98,000
Kangasala, Finland (2003)	23,000
Tala, Kenya (1999)	22,375
Lapua, Finland (2003)	13,000
Nurmo, Finland (2003)	11,000
Kauhava, Finland (2003)	8,000
Kuortane, Finland (2003)	4,000

Source: Crenzel and Forte, Article 4 in this publication.

[37] Includes the municipalities of Arauama, Saquarema, Silva Jardim, Armação dos Búzios, Arraial do Cabo, Cabo Frío, Iguaba Grande and S. Pedro da Aldeia.

Table A-2. Step 1: Indicators for each stage of the process

(Scale: 1 = poor / low to 3 = good / high)

		Intake				*Withdrawal/Purification*		*Distribution*					
		Type	*Quality*	*Condition*	***Indicator (1)***	*Volume Produced per resident*	***Indicator (2)***	*Physical efficiency*	*Unaccounted water*	***Indicator (3)***	*Coverage*	***Indicator (4)***	*Piping*
Aguascalientes	Private	Underground	Sulfur	Overexploited	**1**	414	**3**	56		**1**	98	**3**	2.4
Buenos Aires	Private	Combined	Polluted	Abundant	**2**	564	**3**		32	**2**	81	**2**	2.2
Tucumán	Public*	Surface	Polluted	Sufficient	**2**	229	**2**		38	**2**	83.6	**2**	2.1
Cochabamba	Public**	Combined		n/a	**0**	81.3	**1**			**0**	57	**1**	
Niterói	Private	Surface		n/a	**0**	206	**2**	76		**2**	97	**3**	2.6
Limeira	Private	Surface		Abundant	**3**	194	**1**		17	**3**	100	**3**	3.8
Lakes Region	Private	n/a		n/a	**0**		**0**				90	**2**	
Nyeri	Private	Surface		Abundant	**3**	164	**2**			**0**	38	**1**	2.5
Tala	Private	Underground		Insufficient	**2**	7	**1**		40	**1**		**0**	0.4
Dar es Salaam	Private	Combined	Alkaline/sedim	Abundant	**2**	0.1	**1**	60		**1**	33	**1**	8.7
Kangasala	Public	Underground		Sufficient	**3**	172	**1**		21	**3**	87	**2**	
Lahti	Public	Underground	Worsening	n/a	**2**	371	**2**		7	**3**	98	**3**	4.8
Lappavesi and other cities	Public	n/a			**0**		**0**			**0**		**0**	
Thames River basin	Private	Combined	Polluted	Sufficient	**2**	353	**2**	74.5		**2**	100	**3**	
Athens	Mixed	Surface	Salinisation	Scarce	**1**	520	**3**		25	**2**	99	**3**	2.5

* Failed private concession (1995-1997) taken over by the provincial government.
** Failed private concession (1999-2000), taken over by the municipal government.

Table A-2 (… continued)

	Consumption	*Drainage*				*Sanitation*	
	Connections per km	*Coverage*	*Rate connection*	***Indicator (5)***	*Type of drainage*	*Volume treated*	***Indicator (6)***
Aguascalientes	125.9	97	1.9*	**3**	Unico	84	**2**
Buenos Aires	164.7	62	4.3	**1**	Dual		**0**
Tucumán*	94.1	36.7	8.8	**1**	Dual		**0**
Cochabamba**	76.9	54	13.3	**1**		30	**1**
Niterói	61.1	75		**1**		43.7	**1**
Limeira	75.8	100		**3**		45.5	**1**
Lakes Region				**0**			**0**
Nyeri	73.6	13.4		**1**			**0**
Tala	144.9			**0**	None		**0**
Dar es Salaam	121.3	10	72	**1**			**0**
Kangasala	22	83	56.7	**2**	Dual	100	**3**
Lahti	25.1	97	61	**3**	Dual	100	**3**
Lappavesi and other cities				**0**			**0**
Thames River basin		100	4	**3**	Dual	100	**3**
Athens	253.9	92	3.5	**3**	Dual	100	**3**

* Failed private concession (1995-1997) taken over by the provincial government.
** Failed private concession (1999-2000), taken over by the municipal government.

Table A-3. Step 2: Indicators average

		Indicator (1)	*Indicator (2)*	*Indicator (3)*	*Indicator (4)*	*Indicator (5)*	*Indicator (6)*	*Average*
Aguascalientes	Private	**1**	**3**	**1**	**3**	**3**	**2**	2.2
Buenos Aires	Private	**2**	**3**	**2**	**2**	**1**		2.0
Tucumán*	Public	**2**	**2**	**2**	**2**	**1**		1.8
Cochabamba**	Public		**1**		**1**	**1**	**1**	1.0
Niterói	Private		**2**	**2**	**3**	**1**	**1**	1.8
Limeira	Private	**3**	**1**	**3**	**3**	**3**	**1**	2.3
Nyeri	Private	**3**	**2**		**1**	**1**		1.8
Tala	Private	**2**	**1**	**1**				1.3
Dar es Salaam	Private	**2**	**1**	**1**	**1**	**1**		1.2
Kangasala	State	**3**	**1**	**3**	**2**	**2**	**3**	2.3
Lahti	State	**2**	**2**	**3**	**3**	**3**	**3**	2.7
Thames River basin	Private	**2**	**2**	**2**	3	3	3	2.5
Athens	Mixed	**1**	**3**	**2**	**3**	**3**	**3**	2.5

* Failed private concession (1995-1997) taken over by the provincial government.
** Failed private concession (1999-2000), taken over by the municipal government.

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